TECHNICAL MEMORANDUM

Summary of Interim Measure Implemented at the Tank 1010 Site, Union Carbide Corporation Institute Facility, Institute, West Virginia

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This technical memorandum presents a summary of an interim measure implemented in 2014 and 2015 at the Tank 1010 site (Site) located within the Union Carbide Corporation (UCC) Institute Facility, Institute, West Virginia (facility) (see Figure 1). The remedy evaluation and selection was documented in the "Tank 1010 Area Remedial Approach Report" (CH2M 2015).

Background

Tank 1010 is a 1.47-million-gallon aboveground storage tank placed into service in 1943 to store benzene. The benzene was used as a raw material for two styrene production units in the facility. Benzene was received by railcar on either side of a concrete piping trench located north of the Tank 1010 secondary containment dike wall (Figure 2). The benzene was transferred to Tank 1010 by connecting a flexible hose at the base of the railcar to a pipe connection within the trench. The pipe ran from the trench through a concrete casing beneath the railroad siding and then emerged and connected to Tank 1010 within the secondary containment area (Figure 2). Benzene was transferred from Tank 1010 to the styrene production units via piping going through a tunnel beneath the tracks on the northwest side of the tank secondary containment area (Figure 2). Tank 1010 remained in benzene service until 1981. Since 1981, the tank has been in service for the glycol process unit and currently is used for the storage of anti-freeze grade ethylene glycol.

Site Geology

The Site is comprised of up to 10 feet of fill material. The fill material is underlain by up to 38 feet of low-permeability clay inter-bedded with discontinuous lenses and seams of more permeable materials (Figure 3). The seams, lenses, and gradational changes result in a number of heterogeneities throughout the clayey unit. These heterogeneities influence the contaminant distribution and migration pathways between the source area and areas hydraulically downgradient. The clayey unit is underlain by a saturated sand unit ranging in thickness up to 14 feet. The sand unit is thicker on the north side of Tank 1010 and becomes thinner as it approaches the Kanawha River, which is located approximately 200 feet south of the tank. The sand unit is underlain by bedrock.

Site Hydrogeology

The clayey unit becomes saturated between 10 and 15 feet below ground surface (bgs) and exhibits a higher potentiometric head than the underlying sand unit, which indicates a general downward vertical gradient from the clayey unit into the underlying sand unit. The more permeable seams and lenses within the clayey unit facilitate the downward and horizontal migration of groundwater into the

underlying sand unit. However, the seams and lenses do not appear to provide a direct groundwater flow path to the Kanawha River. The sand unit is most likely the preferential groundwater flow pathway to the Kanawha River. The horizontal groundwater flow within the sand unit is generally to the south and southeast, towards the Kanawha River.

Pore Water

Pore water samples were collected from the Kanawha River and analyzed for volatile organic compounds (VOCs). Benzene was not detected in pore water.

Remedial Action Objectives

Remedial action objectives (RAOs) were developed for the facility and established in accordance with the Resource Conservation and Recovery Act framework to be protective of human health and the environment (CH2M 2015). Based on the facility RAOs and site-specific conditions, the following RAOs were retained for the Tank 1010 Area:

1. Reduce source area VOC mass (primarily benzene) in the source area north of Tank 1010;
2. Improve groundwater quality consistent with the groundwater performance monitoring plan;
3. Address vapor intrusion risks with active soil/groundwater remediation or engineering controls, as necessary; and
4. Prevent unacceptable direct contact with soil and groundwater through engineering and/or institutional controls.

Remedial Technology Screening and Alternative Evaluation

A target treatment zone (TTZ) of 2,600 square feet (130 feet by 20 feet) was established for the alternative evaluation (Figure 4). This TTZ represented the area accessible to remediation and where benzene was detected in soil at concentrations greater than approximately 20 milligrams per kilogram. The TTZ size was limited by the presence of active Norfolk Southern Railroad lines to the north, facility tunnels to the west, and Tank 1010 dike wall and infrastructure to the south. The TTZ encompassed the former pipe trench and inactive railroad sidings formerly used to transfer benzene from railcars to Tank 1010.

Remedial technologies were screened as part of the remedial alternatives evaluation based on implementability, effectiveness, and relative cost (CH2M 2015). Based on the screening, three remedial alternatives were developed based on the retained technologies and evaluated. The remedial alternatives included:

- Alternative 1 – Excavation, Ex Situ Onsite Treatment, and Offsite Disposal or Onsite Reuse
- Alternative 2 – Excavation, Offsite Treatment, and Offsite Disposal
- Alternative 3 – In Situ Treatment via Oxidant Injection

Administrative and institutional controls and natural attenuation groundwater monitoring were included as part of all three of the above alternatives and are not part of this interim measure.

No alternatives were capable of reaching the entire source area due to existing infrastructure at the site. Alternative 3 was selected because it was the most feasible to safely implement, had the capability to treat a larger volume of soil than the excavation methods, and because it could be implemented at a lower cost.

The oxidant selected for application was a proprietary reagent by Deep Earth Technologies, Inc. (DTI) called Cool-Ox™. Cool-Ox™ is an in situ chemical oxidation (ISCO) reagent developed by DTI. The

patented Cool-Ox™ process is an in situ remediation technology that combines controlled chemical oxidation with accelerated biodegradation subsequent to the oxidation phase. Cool-Ox™ was selected as the reagent following a detailed evaluation of reagent options because it is effective in addressing the site-specific constituents of concern (COCs) (primarily benzene) and because the reaction is controllable and does not create heat, eliminating safety concerns related to the high COC concentrations and proximity to sensitive structures.

Remedy Implementation

Two injection events were completed at the site. The first Cool-Ox™ injection event was conducted in November and December 2014 and followed up by soil and groundwater performance monitoring 30 and 90 days after injection (January and March 2015, respectively). Additional soil and groundwater sampling were completed in August 2015 to collect supplemental data to optimize any follow-on injection activities or future interim measures implemented at the Site. A second Cool-Ox™ injection event was conducted in December 2015 and followed up by soil and groundwater performance monitoring 90 days after injection (March 2016). Figure 4 presents the TTZs for both of the injection events.

2014 Injection and Associated Performance Monitoring

The Cool-Ox™ was injected using a phased approach as follows:

- Phase 1 – Assess ability to inject Cool-Ox™ and distribute within soils across a target pilot area (20 feet by 20 feet) at depths ranging from 5 to 35 feet bgs. The terminal depth of the injection was within the lower portion of the clayey unit.
- Phase 2 –Apply Cool-Ox™ to the remainder of the TTZ (approximately 110-foot by 20-foot area) at depths ranging from 5 to 35 feet bgs. Phase 2 was only to be implemented after Phase 1 if the pilot application successfully demonstrated Cool-Ox™ injection and distribution into Site soils.

A West Virginia Department of Environmental Protection (WVDEP) Underground Injection Control (UIC) Program rule authorization letter was obtained prior to implementing injection activities.

Site Preparation

In October 2014, prior to implementing Phase 1, CH2M coordinated demolition of the two inactive railroad sidings, Tank 1010 piping, and concrete piping trench located within the TTZ (Figure 4). An approximate 30-foot section of the concrete trench containing piping for Tank 1009 was left in place on the eastern portion of the TTZ.

Metal debris associated with the former rail sidings was managed by Bayer CropScience (BCS) for recycling. BCS was the owner of the Institute facility at the time of demolition. Railroad ties were placed in a roll-off box. Metal debris and concrete from the piping trench were placed in a separate roll-off box. With the exception of the steel rails and plates, waste material generated during demolition was characterized prior to transport and disposal. Care was exercised as to not damage the four existing monitoring wells within the TTZ.

Injection Summary

In November and December 2014, Phase 1 and 2 were implemented within the TTZ. Injection borings were spaced approximately 4 feet apart on a grid pattern across the entire TTZ. The volume of Cool-Ox™ injected generally ranged between 60 and 80 gallons per injection boring, resulting in a total volume of approximately 11,800 gallons being injected. The 2014 Phase 1 and 2 injection logs from DTI are provided as Attachments A and B, respectively. The injection methods were field adjusted to optimize the volume of reagent injected and distribution within the subsurface. Following completion

of injection activities, clean gravel was spread over the TTZ and compacted to raise and slightly level the ground surface for performance monitoring activities.

Performance Monitoring

Performance monitoring was completed 30 and 90 days following CoolOx™ injection to monitor VOC trends within TTZ soil and groundwater, and consisted of:

- Collecting soil samples using direct-push technology (DPT) methods from borings offset approximately 2 feet from three historical borings sampled as part of an October 2013 investigation (INS-417, INS-420, INS-422, Figure 5).
- Collecting groundwater samples from the four monitoring wells installed within the TTZ and screened within the clayey unit (MW-0451 through MW-0454, Figure 5). In addition, groundwater samples were collected from downgradient monitoring wells screened within the underlying sand unit (TW-66B, TW-74B, and TW-75B, Figure 2).

The DPT borings were advanced to a maximum depth of 35 feet bgs. Soil samples were collected from approximately the same depth interval sampled during the October 2013 investigation. Additional soil samples were collected based on high photoionization detector [PID] readings. Soil samples were submitted to an offsite laboratory for VOC analysis. This sampling approach allowed for a relative comparison between pre- and post-injection concentrations in soil and provided additional samples based on field observations.

The monitoring wells were purged and sampled following standard procedures developed for the sitewide long-term groundwater monitoring program. Groundwater samples were submitted to an offsite laboratory for VOC analysis. Performance monitoring data are provided in the Results section of this memorandum. Laboratory reports from the 2015 performance monitoring events are provided in Attachment E. The data were used for screening-level and performance monitoring purposes only and, therefore, were not validated.

2015 Soil and Groundwater Sampling

In August 2015, additional soil and groundwater sampling was completed within the 2014 injection TTZ. The primary objective of the soil sampling was to collect a higher density of samples that would provide improved resolution of benzene concentrations in the clayey unit and allow a more robust assessment of any future CoolOx™ injections. Therefore, the sampling approach was modified to collect samples at an increased number of boring locations within the TTZ and at a larger number of vertical intervals within each boring. In addition, the approach was modified to analyze samples at preselected elevations at each boring location rather than at biased intervals based on field screening observations.

A total of 18 soil borings (INS-508 through INS-525) were advanced using DPT methods to a terminal depth of 20 feet bgs (Figure 5). The terminal depth was selected based on January and March 2015 performance monitoring results. Soil samples were collected every 2 feet starting at 5 feet bgs and ending at 19 feet bgs (eight samples per boring). This resulted in a total of 144 grab soil samples being collected from discreet depth intervals. Additional biased samples were collected at 15 locations where field screening of soil exhibited PID readings higher than those measured at the discreet sample depths. Soil samples were submitted to an offsite laboratory for benzene, toluene, ethylbenzene, and xylene (BTEX) analysis.

Groundwater samples were collected from monitoring wells MW-0451 through MW-0454 located within the TTZ and screened within the clay unit (Figure 5). Groundwater samples were submitted to an offsite laboratory for VOC analysis. Laboratory reports from August 2015 sampling activities are provided in Attachment E. The data were used for screening-level and performance monitoring purposes only and, therefore, were not validated.

2015 Injection and Associated Performance Monitoring

Based on the August 2015 soil and groundwater data, UCC decided to complete a second injection event. The size of the TTZ and vertical injection interval were reduced in order to focus injection activities on the areas where benzene was detected at highest concentrations in soil in August 2015. The TTZ area was reduced to approximately 945 square feet (105 feet by 9 feet), and the vertical target injection interval ranged between 10 and 20 feet bgs (Figure 4). Prior to implementing injection activities, the WVDEP UIC Program rule authorization letter was renewed.

Injection Summary

Injection activities were completed in December 2015. A total of 90 injection borings were advanced across the updated TTZ with 60 of the borings being spaced 3 feet apart and the remaining 30 borings being spaced 4 feet apart. The borings spaced closer together were located on the south side of the TTZ where benzene concentrations in soil were the highest. The volume of Cool-Ox™ injected ranged between 20 and 30 gallons per injection boring, which resulted in a total injection volume of 2,100 gallons. The lower end of this range was injected into those borings spaced 3 feet apart, and the higher end of the range was injected into those borings spaced 4 feet apart. The smaller injection volume was used in the borings spaced 3 feet apart in order to minimize short-circuiting and daylighting of the Cool-Ox™. The 2015 injection logs from DTI are provided as Attachment C.

Performance Monitoring

Performance monitoring was completed 90 days following CoolOx™ injection (March 2016). Soil samples were collected using DPT methods from borings co-located with a subset of the borings advanced in August 2015. The subset of borings included those located within or immediately adjacent to the smaller December 2015 TTZ.

Eleven soil borings were advanced using DPT methods to a terminal depth of 20 feet bgs (Figure 5). The number of soil borings was reduced from 18 to 11 between the August 2015 sampling event and 2016 performance monitoring event to focus sample collection on the smaller TTZ. Soil samples were collected every 2 feet starting at 7 feet bgs and ending at 19 feet bgs (seven samples per boring). This resulted in a total of 77 grab soil samples being collected from discreet depth intervals. Soil at 5 feet bgs was not sampled in 2016 because of the low frequency at which benzene had been detected at this depth in August 2015. Soil samples collected in March 2016 were submitted to an offsite laboratory for BTEX analysis. No additional soil samples were collected.

Groundwater samples were collected again from monitoring wells MW-0451 through MW-0454 (Figure 5). Groundwater samples were submitted to an offsite laboratory for VOC analysis. Laboratory reports from the March 2016 performance monitoring event are provided in Attachment E. The data were used for screening-level and performance monitoring purposes only and, therefore, were not validated.

Summary of Results

This section provides a summary of the soil and groundwater performance monitoring results. Table 1 presents a summary of pre-injection soil data from samples collected in 2011 and 2013 in what would become the TTZ, and soil data collected in January and April 2015, approximately 30 and 90 days after the 2014 injection event. Tables 2 and 3 present a summary of the August 2015 and March 2016 soil data, respectively. The soil data are presented in the tables to align with the layout of the borings shown in Figure 5.

The soil data from both the August 2015 and March 2016 sampling events were contoured in three dimensions using a Kriging algorithm utilizing Mining Visualization System (MVS by CTech Corporation)

software. The data were then presented as "slice planes" to illustrate the nature and extent of benzene within the 2014 and 2015 TTZs (Attachment D). The MVS images in Attachment D present a side-by-side comparison of benzene distribution in soil before and after the December 2015 injection event. The horizontal slices presented are representative of the discreet depth intervals sampled in August 2015 and March 2016. The vertical slice planes are representative of the benzene distribution in soil along the southern and middle row of soil borings. Due to the limited number of soil borings advanced in 2016, a comparison of the slice planes along the northern row of borings was not generated.

Tables 4 and 5 present a summary of groundwater data collected from monitoring wells screened in the clayey and sandy units, respectively. Exhibit 1 presents benzene trends in monitoring wells screened in the clayey unit.

Soil

The data indicate that the treatment was not effective at significantly reducing benzene concentrations in soil in the TTZ. Between the August 2015 and March 2016 sampling events, benzene concentrations decreased at some depths while increasing at others. The results are best illustrated in the contoured data presented in Attachment D, which utilized the higher data density collected before and after the second CoolOx™ injection.

The highest residual benzene concentrations in soil have been detected between the former pipe trench and northern dike wall at the southern edge of the TTZ at depths ranging between 10 and 20 feet bgs (Attachment D). The primary soil types observed across this depth interval range from a lean clay to clayey sand. The magnitude of benzene concentrations detected immediately adjacent to the dike wall likely indicate the presence of non-aqueous phase liquid (NAPL). However, NAPL was not directly observed in soil cores.

Groundwater

Shallow Groundwater

Following both injection events, an increase in pH, dissolved oxygen, and oxidation reduction potential were generally observed at wells located within the TTZ and screened in the target injection interval. The changes were anticipated and indicated that the oxidant had influenced the shallow groundwater chemistry within the vicinity of those monitoring wells.

A reduction in benzene concentrations was observed at MW-0451 approximately 30 days after the 2014 injection event, and the reduced concentrations remained relatively stable through 2016 as shown in Table 4. MW-0451 is located on the west end of the TTZ where benzene concentrations in soil have been orders of magnitude lower than in the central portion of the TTZ and is in an area that was not treated by the 2015 injection. Similarly, a reduction in benzene was observed in MW-0453 in the eastern end of the TTZ following the 2014 CoolOx™ injection; however, the concentration rebounded following the 2015 CoolOx™ injection.

Benzene concentrations in groundwater at MW-0452 and MW-0454, located in the central portion of the TTZ where concentrations are the highest, did not appear to be affected by either CoolOx™ injection.

Exhibit 1 presents the benzene trends in shallow groundwater.

Deep Groundwater

No significant changes in groundwater chemistry and benzene concentrations were observed at downgradient monitoring wells screened within the underlying sand (TW-66B, TW-74B, and TW-75B). This was expected as the underlying sand was not directly targeted by injection activities.

References

CH2M. 2015. *Tank 1010 Remedial Approach Report*, Institute Facility, Institute, West Virginia. December.

Tables

Table 1. Summary of Soil Results - May 2011 to April 2015

Tank 1010 Interim Measure Summary

Union Carbide Corporation Institute Facility, Institute, West Virginia

Borings Advanced in the Western Portion of 2014 Injection TTZ

	INS-0053		INS-417										
	Pre-Injection		Pre-Injection	Pre-Injection	Post 30-Day		Post 90-Day		Pre-Injection	Post 30-Day	Post 90-Day	Post 30-Day	Post 90-Day
Sample Depth (ft bgs)	11.5-12	18.5-19	2 - 3	11.5 - 12	11.5	12.5	11.5 - 12.0	12.5 - 13.0	15 - 15.5	15	15 - 15.5	18.5	18.5 - 19.0
Sample Date	5/4/2011	5/4/2011	10/23/2013	10/23/2013	1/20/2015	1/20/2015	4/1/2015	4/1/2015	10/23/2013	1/20/2015	4/1/2015	1/20/2015	4/1/2015
Benzene	**17,800**	**1,570,000**	**1,920**	**10,300**	550 U	**20,800**	5.21 U	**16,900**	**58,200**	**14,400**	**54,000**	**202**	**7.17**
Ethylbenzene	526 U	**2,440**	513 U	612 U	550 U	**1,770**	5.21 U	**26.3**	1,360 U	**1,800**	**6,840**	7.59 U	5.39 U
Toluene	526 U	**714**	513 U	612 U	550 U	613 U	5.21 U	4.85 U	1,360 U	593 U	1,370 U	7.59 u	5.39 U
Xylenes, Total	1,050 U	**3,330**	513 U	612 U	550 U	613 U	5.21 U	4.85 U	1,360 U	**1,190**	**2,280**	7.59 u	5.39 U

Borings Advanced in the Central Portion of 2014 Injection TTZ

	INS-0054		INS-420						
	Pre-Injection		Pre-Injection	Post 30-Day	Post 90-Day	Post 30-Day	Post 90-Day	Post 30-Day	Post 90-Day
Sample Depth (ft bgs)	5-5.5	19-19.5	2 - 3	5.5	5.5 - 6.0	9.5	9.5 - 10.0	17	16.0 - 16.5
Sample Date	5/4/2011	5/4/2011	10/25/2013	1/20/2015	4/1/2015	1/20/2015	4/1/2015	1/20/2015	4/1/2015
Benzene	**20,400**	**17,500,000**	**7,800**	**10,800**	**9.95**	**66,500**	**10.5**	**120,000**	**245,000**
Ethylbenzene	555 U	**78,100**	583 U	556 U	4.63 U	1,070 U	5.06 U	3,290 U	**30,000**
Toluene	555 U	**3,660**	583 U	556 U	4.63 U	1,070 U	5.06 U	3,290 U	3,140 U
Xylenes, Total	1,110 U	1,310 U	583 U	556 U	4.63 U	1,070 U	5.06 U	3,290 U	3,140 U

Borings Advanced in the Eastern Portion of 2014 Injection TTZ

	INS-422						
	Pre-Injection	Pre-Injection	Post 30-Day	Post 90-Day	Pre-Injection	Post 30-Day	Post 90-Day
Sample Depth (ft bgs)	1 - 2	11.5 - 12	11.5	11.5 - 12.0	15.8 - 16.3	15.8	15.8 - 16.3
Sample Date	10/24/2013	10/24/2013	1/20/2015	4/1/2015	10/24/2013	1/20/2015	4/1/2015
Benzene	5.26 U	**1,730,000**	**63,700**	**20.2**	**150**	**7,160**	5.14 U
Ethylbenzene	5.26 U	**844,000**	**13,900**	**41.2**	**29.9**	**1,550**	5.14 U
Toluene	5.26 U	58,000 U	1,280 U	5.18 U	5.94 U	546 U	5.14 U
Xylenes, Total	5.26 U	**697,000**	1,280 U	5.18 U	5.94 U	546 U	5.14 U

Notes:

This table presents a summary of soil data collected from within the 2014 injection TTZ. The borings were either associated with a historical investigation or the 2014 injection activities

ft bgs = feet below ground surface

Concentrations reported in micrograms per kilogram (µg/kg)

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

- Bolded and shaded values indicate a detection

- Soil samples were submitted for VOC analysis, but only detected BTEX compounds are reported in this table

Table 2. Summary of August 2015 Soil Results

Tank 1010 Interim Measure Summary

Union Carbide Corporation Institute Facility, Institute, West Virginia

North Row of Soil Borings

	INS-0508				INS-0511				INS-0514				INS-0517				INS-0520				INS-0523			
Depth (ft bgs)	Benzene	Ethylbenzene	Toluene	Xylene	Benzene	Ethylbenzene	Toluene	Xylene	Benzene	Ethylbenzene	Toluene	Xylene	Benzene	Ethylbenzene	Toluene	Xylene	Benzene	Ethylbenzene	Toluene	Xylene	Benzene	Ethylbenzene	Toluene	Xylene
4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1,370**	609 U	609 U	609 U	NA	NA	NA	NA	NA	NA	NA	NA
5	4.39 U	4.39 U	4.39 U	4.39 U	4.91 U	4.91 U	4.91 U	4.91 U	**6.61**	4.90 U	4.90 U	4.90 U	5.08 U	5.08 U	5.08 U	5.08 U	4.93 U	4.93 U	4.93 U	4.93 U	5.08 U	5.08 U	5.08 U	5.08 U
7	4.82 U	4.82 U	4.82 U	4.82 U	4.86 U	4.86 U	4.86 U	4.86 U	**4.83**	4.55 U	4.55 U	4.55 U	4.16 U	4.16 U	4.16 U	4.16 U	4.80 U	4.80 U	4.80 U	4.80 U	4.74 U	4.74 U	4.74 U	4.74 U
9	4.71 U	4.71 U	4.71 U	4.71 U	4.87 U	4.87 U	4.87 U	4.87 U	**5.44**	5.20 U	5.20 U	5.20 U	4.78 U	4.78 U	4.78 U	4.78 U	4.68 U	4.68 U	4.68 U	4.68 U	4.97 U	4.97 U	4.97 U	4.97 U
11	4.87 U	4.87 U	4.87 U	4.87 U	4.79 U	4.79 U	4.79 U	4.79 U	**5.53**	4.49 U	4.49 U	4.49 U	4.82 U	4.82 U	4.82 U	4.82 U	5.05 U	5.05 U	5.05 U	5.05 U	4.86 U	4.86 U	4.86 U	4.86 U
12	NA	NA	NA	NA	**656,000**	11,000 U	11,000 U	11,000 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
13	555 U	555 U	555 U	555 U	**417,000**	11,500 U	11,500 U	11,500 U	526 U	526 U	526 U	526 U	5.90 U	5.90 U	5.90 U	5.90 U	5.29 U	5.29 U	5.29 U	5.29 U	5.43 U	5.43 U	5.43 U	5.43 U
15	594 U	594 U	594 U	594 U	518 U	518 U	518 U	518 U	**6.43**	4.66 U	4.66 U	4.66 U	5.00 U	5.00 U	5.00 U	5.00 U	5.25 U	5.25 U	5.25 U	5.25 U	5.20 U	5.20 U	5.20 U	5.20 U
17	**179,000**	5,540 U	5,540 U	5,540 U	4.48 U	4.48 U	4.48 U	4.48 U	5.12 U	5.12 U	5.12 U	5.12 U	5.30 U	5.30 U	5.30 U	5.30 U	6.21 U	6.21 U	6.21 U	6.21 U	6.56 U	6.56 U	6.56 U	6.56 U
19	**1,050**	5.22 U	5.22 U	5.22 U	**193**	5.14 U	5.14 U	5.14 U	**21.6**	5.27 U	5.27 U	5.27 U	5.19 U	5.19 U	5.19 U	5.19 U	4.78 U	4.78 U	4.78 U	4.78 U	5.23 U	5.23 U	5.23 U	5.23 U

Notes:

ft bgs = feet below ground surface

Concentrations reported in micrograms per kilogram (µg/kg)

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

NA = Soil sample not collected at the corresponding depth

- Bolded and shaded values indicate a detection
- Soil samples were submitted for BTEX analysis

Table 2. Summary of August 2015 Soil Results

Tank 1010 Interim Measure Summary

Union Carbide Corporation Institute Facility, Institute, West Virginia

Middle Row of Soil Borings

	INS-0509				INS-0512				INS-0515				INS-0518				INS-0521				INS-0524			
Depth (ft bgs)	Benzene	Ethylbenzene	Toluene	Xylene	Benzene	Ethylbenzene	Toluene	Xylene	Benzene	Ethylbenzene	Toluene	Xylene	Benzene	Ethylbenzene	Toluene	Xylene	Benzene	Ethylbenzene	Toluene	Xylene	Benzene	Ethylbenzene	Toluene	Xylene
5	5.29 U	5.29 U	5.29 U	5.29 U	**1,220**	550 U	550 U	550 U	5.19 U	5.19 U	5.19 U	5.19 U	4.65 U	4.65 U	4.65 U	4.65 U	**5.06**	4.68 U	4.68 U	4.68 U	5.10 U	5.10 U	5.10 U	5.10 U
7	4.89 U	4.89 U	4.89 U	4.89 U	**4.86**	4.66 U	4.66 U	4.66 U	**10.6**	5.12 U	5.12 U	5.12 U	4.78 U	4.78 U	4.78 U	4.78 U	**19.7**	4.59 U	4.59 U	4.59 U	4.89 U	4.89 U	4.89 U	4.89 U
9	4.86 U	4.86 U	4.86 U	4.86 U	**5.17**	4.47 U	4.47 U	4.47 U	**2,300**	528 U	528 U	528 U	4.77 U	4.77 U	4.77 U	4.77 U	**9.28**	4.79 U	4.79 U	4.79 U	**7.88**	4.68 U	4.68 U	4.68 U
11	5.12 U	5.12 U	5.12 U	5.12 U	**68,300**	2,690 U	2,690 U	2,690 U	**109,000**	5,790 U	5,790 U	5,790 U	**6,810**	**728**	557 U	557 U	**12.3**	5.08 U	5.08 U	5.08 U	**1,970**	**669**	597 U	597 U
12	NA	NA	NA	NA	**108,000**	2,780 U	2,780 U	2,780 U	**271,000**	**17,000**	5,430 U	5,430 U	NA	NA	NA	NA	NA	NA	NA	NA	**45,900**	**7,280**	1,080 U	1,080 U
13	544 U	544 U	544 U	544 U	**848,000**	29,000 U	29,000 U	29,000 U	**707,000**	**115,000**	17,300 U	17,300 U	**3,510**	**4,150**	515 U	515 U	**7.17**	5.09 U	5.09 U	5.09 U	**45,300**	**4,280**	1,230 U	1,230 U
15	**32.5**	5.05 U	5.05 U	5.05 U	**861,000**	25,600 U	25,600 U	25,600 U	**42,700**	**11,700**	1,260 U	1,260 U	**11,300**	**650**	427 U	427 U	5.04 U	5.04 U	5.04 U	5.04 U	**19,600**	561 U	561 U	561 U
16.5	**45,500**	**1,440**	1,130 U	1,130 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
17	**12,600**	579 U	579 U	579 U	**824,000**	22600 U	22600 U	22600 U	779 U*	**59.7**	6.42 U	6.42 U	4.89 U	4.89 U	4.89 U	4.89 U	5.69 U	5.69 U	5.69 U	5.69 U	**8.26**	7.01 U	7.01 U	7.01 U
19	**27,200**	777 U	777 U	777 U	**39,200**	1,340 U	1,340 U	1,340 U	5.20 U	5.20 U	5.20 U	5.20 U	5.04 U	5.04 U	5.04 U	5.04 U	**8.71**	5.77 U	5.77 U	5.77 U	4.98 U	4.98 U	4.98 U	4.98 U

Notes:

ft bgs = feet below ground surface

Concentrations reported in micrograms per kilogram (µg/kg)

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

NA = Soil sample not collected at the corresponding depth

- Bolded and shaded values indicate a detection
- Soil samples were submitted for BTEX analysis

Table 2. Summary of August 2015 Soil Results

Tank 1010 Interim Measure Summary

Union Carbide Corporation Institute Facility, Institute, West Virginia

South Row of Soil Borings

	INS-0510				INS-0513				INS-0516				INS-0519				INS-0522				INS-0525			
Depth (ft bgs)	Benzene	Ethylbenzene	Toluene	Xylene	Benzene	Ethylbenzene	Toluene	Xylene	Benzene	Ethylbenzene	Toluene	Xylene	Benzene	Ethylbenzene	Toluene	Xylene	Benzene	Ethylbenzene	Toluene	Xylene	Benzene	Ethylbenzene	Toluene	Xylene
5	4.76 U	4.76 U	4.76 U	4.76 U	**32,600**	1,100 U	1,100 U	1,100 U	**5.97**	4.87 U	4.87 U	4.87 U	4.96 U	4.96 U	4.96 U	4.96 U	5.53 U	5.53 U	5.53 U	5.53 U	4.91 U	4.91 U	4.91 U	4.91 U
7	**6.91**	4.84 U	4.84 U	4.84 U	**224**	4.48 U	4.48 U	4.48 U	**9.19**	4.84 U	4.84 U	4.84 U	**17,000**	**643**	519 U	519 U	**5.61**	5.39 U	5.39 U	5.39 U	4.83 U	4.83 U	4.83 U	4.83 U
9	5.35 U	5.35 U	5.35 U	5.35 U	**4,850**	553 U	553 U	553 U	**10.1**	5.32 U	5.32 U	5.32 U	**49,700**	**1,730**	1,080 U	1,080 U	**20.1**	**22.2**	4.65 U	4.65 U	**8.45**	4.79 U	4.79 U	4.79 U
11	4.93 U	4.93 U	4.93 U	4.93 U	**44,100**	1,030 U	1,030 U	1,030 U	**190,000**	**6,230**	5,480 U	5,480 U	**472,000**	**43,000**	11,200 U	11,200 U	**3,550**	**1,790**	549 U	549 U	**150,000**	**8,770**	6,140 U	6,140 U
12	NA	NA	NA	NA	**67,100**	2,940 U	2,940 U	2,940 U	**272,000**	**8,750**	4,890 U	4,890 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
13	629 U	629 U	629 U	629 U	**5,560,000**	570,000 U	570,000 U	570,000 U	**4,840,000**	553,000 U	553,000 U	553,000 U	**7,630,000**	**184,000**	58,800 U	58,800 U	**4,160,000**	105,000 U	105,000 U	105,000 U	**11,900,000**	565,000 U	565,000 U	565,000 U
14	564 U	564 U	564 U	564 U	NA	NA	NA	NA	NA	NA	NA	NA	**17,200,000**	**385,000**	56,800 U	56,800 U	**5,860,000**	**189,000**	**1,420**	551 U	**3,450,000**	**238,000**	114,000 U	114,000 U
15	563 U	563 U	563 U	563 U	**6,520,000**	604,000 U	604,000 U	604,000 U	**4,470,000**	547,000 U	547,000 U	547,000 U	**3,300,000**	**101,000**	53,800 U	53,800 U	**517,000**	12,200 U	12,200 U	12,200 U	**138,000**	**9,350**	581 U	581 U
17	**24,400**	598 U	598 U	598 U	**474,000**	5,720 U	5,720 U	5,720 U	**4,520,000**	593,000 U	593,000 U	593,000 U	**2,360,000**	**90,500**	58,400 U	58,400 U	**6,850,000**	567,000 U	567,000 U	567,000 U	**12.2**	7.95 U	7.95 U	7.95 U
19	568 U	568 U	568 U	568 U	**336,000**	5,690 U	5,690 U	5,690 U	**181,000**	5,780 U	5,780 U	5,780 U	**741**	**79.3**	5.01 U	5.01 U	**9.40**	5.16 U	5.16 U	5.16 U	**9.27**	5.54 U	5.54 U	5.54 U

Notes:

ft bgs = feet below ground surface

Concentrations reported in micrograms per kilogram (µg/kg)

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

NA = Soil sample not collected at the corresponding depth

- Bolded and shaded values indicate a detection
- Soil samples were submitted for BTEX analysis

Table 3. Summary of March 2016 Soil Results

Tank 1010 Interim Measure Summary

Union Carbide Corporation Institute Facility, Institute, West Virginia

North Row of Soil Borings

	INS-511B			
Depth (ft bgs)	Benzene	Ethylbenzene	Toluene	Xylene
7	**8.75**	4.79 U	4.79 U	4.79 U
9	**45.1**	4.71 U	4.71 U	4.71 U
11	**75**	4.87 U	4.87 U	4.87 U
13	**17**	4.78 U	4.78 U	**13.3**
15	**268,000**	**6,170**	5850 U	5850 U
17	**238,000**	6200 U	6200 U	6200 U
19	**205**	4.74 U	4.74 U	4.74 U

Middle Row of Soil Borings

	INS-512B				INS-515B				INS-518B				INS-521B				INS-524B			
Depth (ft bgs)	Benzene	Ethylbenzene	Toluene	Xylene	Benzene	Ethylbenzene	Toluene	Xylene	Benzene	Ethylbenzene	Toluene	Xylene	Benzene	Ethylbenzene	Toluene	Xylene	Benzene	Ethylbenzene	Toluene	Xylene
7	4.76 U	4.76 U	4.76 U	4.76 U	**21.5**	4.5 U	4.5 U	4.5 U	**6.3**	4.91 U	4.91 U	4.91 U	**6.16**	4.84 U	4.84 U	4.84 U	4.9 U	4.9 U	4.9 U	4.9 U
9	**5.24**	4.68 U	4.68 U	4.68 U	**8,720**	532 U	532 U	532 U	**21**	4.99 U	4.99 U	4.99 U	**13.6**	4.79 U	4.79 U	4.79 U	**8.77**	4.63 U	4.63 U	4.63 U
11	**5.27**	4.25 U	4.25 U	4.25 U	**115,000**	5060 U	5060 U	5060 U	**97**	**162**	5.12 U	5.12 U	**14.1**	5.04 U	5.04 U	5.04 U	577 U	**905**	577 U	**733**
13	**288,000**	5290 U	5290 U	5290 U	**1,580,000**	**62,700**	48100 U	48100 U	**31,100**	**8,640**	1120 U	1120 U	**6.47**	4.65 U	4.65 U	4.65 U	**217,000**	**23,400**	5220 U	**18,900**
15	**600,000**	11000 U	11000 U	11000 U	**101,000**	**14,200**	2960 U	2960 U	**32,000**	**2,380**	1230 U	1230 U	**13.1**	5.32 U	5.32 U	5.32 U	**150,000**	**9,550**	5030 U	**7,730**
17	**647,000**	12500 U	12500 U	12500 U	**67.1**	5.06 U	5.06 U	5.06 U	**120**	**13.6**	5.12 U	5.12 U	5.09 U	5.09 U	5.09 U	5.09 U	**287**	**15.5**	4.98 U	4.98 U
19	**81,000**	1130 U	1130 U	1130 U	**14.4**	5.43 U	5.43 U	5.43 U	**14.5**	5.15 U	5.15 U	5.15 U	5 U	5 U	5 U	5 U	4.28 U	4.28 U	4.28 U	4.28 U

Notes:

ft bgs = feet below ground surface

Concentrations reported in micrograms per kilogram (µg/kg)

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

- Bolded and shaded values indicate a detection
- Soil samples were submitted for BTEX analysis

Table 3. Summary of March 2016 Soil Results

Tank 1010 Interim Measure Summary

Union Carbide Corporation Institute Facility, Institute, West Virginia

South Row of Soil Borings

	INS-513B				INS-516B				INS-519B				INS-522B				INS-525B			
Depth (ft bgs)	Benzene	Ethylbenzene	Toluene	Xylene	Benzene	Ethylbenzene	Toluene	Xylene	Benzene	Ethylbenzene	Toluene	Xylene	Benzene	Ethylbenzene	Toluene	Xylene	Benzene	Ethylbenzene	Toluene	Xylene
7	**13,000**	555 U	555 U	555 U	**3,320**	560 U	560 U	560 U	**10,200**	536 U	536 U	536 U	**6.23**	4.92 U	4.92 U	4.92 U	4.63 U	4.63 U	4.63 U	4.63 U
9	**11,900**	561 U	561 U	561 U	**2,440**	583 U	583 U	583 U	**28,500**	**775**	552 U	552 U	**5.54**	4.92 U	4.92 U	4.92 U	4.84 U	4.84 U	4.84 U	4.84 U
11	**323,000**	5480 U	5480 U	5480 U	**82,200**	2810 U	2810 U	2810 U	**174,000**	**9,810**	5540 U	5540 U	**2,540**	**1,480**	583 U	583 U	**16,900**	**3,280**	525 U	525 U
13	**7,320,000**	275000 U	275000 U	275000 U	**12,200,000**	298000 U	298000 U	298000 U	**4,590,000**	**180,000**	56100 U	56100 U	**2,780,000**	**308,000**	54200 U	54200 U	**8,420,000**	**564,000**	62100 U	**457,000**
15	**4,730,000**	146000 U	146000 U	146000 U	**4,930,000**	57200 U	57200 U	57200 U	**3,110,000**	**110,000**	58500 U	58500 U	**16,600,000**	**446,000**	60400 U	60400 U	**323,000**	**17,600**	5940 U	5940 U
17	**2,080,000**	58000 U	58000 U	58000 U	**7,320,000**	60700 U	60700 U	60700 U	**5,130,000**	**70,300**	59700 U	59700 U	**2,950,000**	63200 U	63200 U	63200 U	**78.7**	**5.75**	5.14 U	5.14 U
19	**251,000**	6590 U	6590 U	6590 U	**89,100**	2920 U	2920 U	2920 U	**93,300**	**2,850**	570 U	570 U	**94.1**	4.97 U	4.97 U	4.97 U	**18.8**	5.37 U	5.37 U	5.37 U

Notes:

ft bgs = feet below ground surface

Concentrations reported in micrograms per kilogram (µg/kg)

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

- Bolded and shaded values indicate a detection
- Soil samples were submitted for BTEX analysis

Table 4. Summary of Shallow Groundwater Results

Tank 1010 Interim Measure Summary

Union Carbide Corporation Institute Facility, Institute, West Virginia

	INS-/MW-0451 (Well Screen = 8-18 ft bgs)					INS-/MW-0452 (Well Screen = 8-18 ft bgs)					INS-/MW-0454 (Well Screen = 24-34 ft bgs)					INS-/MW-0453 (Well Screen = 8-18 ft bgs)				
	10/24/14	1/22/15	3/31/15	8/26/15	3/8/16	10/24/14	1/22/15	3/31/15	8/26/15	3/8/16	10/24/14	1/22/15	3/31/15	8/26/15	3/8/16	10/24/14	1/22/15	3/31/15	8/26/15	3/8/16
BTEX Compounds (µg/L)																				
Benzene	**342,000**	**37,400**	47,000	**65,800**	**58,000**	**371,000**	**608,000**	**407,000**	**545,000**	**492,000**	**2,670**	**20,100**	**696**	**56,500**	**690**	**283**	**102**	**171**	**5.48**	**171**
Ethylbenzene	**177**	50 U	200 U	500 U	500 U	5,000 U[a]	5,000 U	**417**	2,000 U	2500 U	**12.2**	50 U	2.5 U	41.5	5 U	**49.2**	**18.3**	**7.12**	1 U	**23**
Toluene	**100**	50 U	200 U	500 U	500 U	**88.5**	5,000 U	200 U	2,000 U	2500 U	1 U	50 U	2.5 U	25 U	5 U	1 U	1 U	1 U	1 U	1 U
Xylenes	**180**	50 U	200 U	500 U	500 U	**18.9**	5,000 U	200 U	2,000 U	2500 U	1 U	50 U	2.5 U	25 U	5 U	1 U	1 U	1 U	1 U	1 U
Groundwater Quality Parameters																				
pH	6.77	12.33	8.62	12.01	12.12	6.30	11.79	8.57	7.2	12.49	6.57	11.88	6.37	8.41	8.29	6.48	11.44	11.07	9.48	12.37
ORP (mV)	1.5	-25.8	-69.3	-73.9	-56.5	-57.1	96.6	-29.5	108.9	-40.3	-76.5	59.3	63.7	-24	-67.9	-69.5	20.7	-32.3	66	216
DO (mg/L)	3.27	14.9	24.06	9.48	IE	3.11	14.63	21.94	12.72	IE	4.54	17.37	19.87	5.47	IE	2.82	18.8	24.3	3.67	IE

Notes:

ft bgs = feet below ground surface

µg/L = microgram(s) per liter

mV = millivolts

mg/L = milligram(s) per liter

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

IE = Instrument error (DO sensor)

- Well identification changed in October 2015 from "INS-xxxx" to "MW-xxxx"
- INS-/MW-0452 and INS-/MW-0454 are clustered wells
- INS-/MW-0451 and INS-/MW-0454 were not within the target injection area and interval, respectively, during the 2015 injection event
- Bolded and shaded values indicate a detection
- Groundwater samples were submitted for VOC analysis, but only BTEX compounds are reported in this table due to low detection frequency of other compounds

[a] Result was 680 µg/L but had an "I" flag on first dilution run by lab at 1.0 µg/L reporting limit. On second dilution, ethylbenzene was ND at 5,000 µg/L reporting limit.

Table 5. Summary of Deep Groundwater Results

Tank 1010 Interim Measure Summary

Union Carbide Corporation Institute Facility, Institute, West Virginia

	TW-66B (Well Screen = 33-43 ft bgs)					TW-74B (Well Screen = 40-50 ft bgs)				TW-75B (Well Screen = 43-48 ft bgs)			
	10/19/12	10/22/13	11/10/14	1/21/15	4/2/15	5/30/12	11/11/14	1/22/15	4/2/15	5/31/12	11/10/14	1/22/15	4/2/15
BTEX Compounds (µg/L)													
Benzene	**124,000**	**45,800**	**85,800**	**59,300**	**63,200**	**64,500**	**22,300**	**39,000**	**39,200**	**56,400**	**30,200**	**18,800**	**24,900**
Ethylbenzene	1,000 U	250 U	200 U	250 U	250 U	500 U	200 U	200 U	200 U	250 U	200 U	100 U	100 U
Toluene	1,000 U	250 U	200 U	250 U	250 U	500 U	200 U	200 U	200 U	250 U	200 U	100 U	100 U
Xylenes	5,000 U	250 U	200 U	250 U	250 U	2,500 U	200 U	200 U	200 U	1,250 U	200 U	100 U	100 U
Groundwater Quality Parameters													
pH	5.74	6.29	5.82	6.04	5.64	NR	6.28	6.19	5.88	NR	5.68	5.91	5.44
ORP (mV)	-13.4	-100.4	-0.3	-103.9	-104.7	NR	-33.2	-79.9	-63.1	NR	-28.5	-119.6	-98.7
DO (mg/L)	2.25	4.60	0.93	1.14	3.08	NR	3.53	1.18	4.11	NR	0.86	1.33	3.04

Notes:

ft bgs = feet below ground surface

µg/L = microgram(s) per liter

mV = millivolts

mg/L = milligram(s) per liter

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

NR = Not recorded

- Bolded and shaded values indicate a detection

- Groundwater samples were submitted for VOC analysis, but only BTEX compounds are reported in this table due to low detection frequency of other compounds

Figures

Figure 1
Institute Facility and Site Location Map
Tank 1010 Interim Measure Summary
Union Carbide Corporation Institute Facility
Institute, West Virginia

ch2m

MKE \\LAKEFRONT\PROJ\GIS\DOW\INSTITUTE\REPORTS\2016\TANK1010INTERIMMEASURESUMMARY\MAPFILES\FIGURE 1_SITE LOCATION MAP.MXD AESPEJO 7/1/2016 1:08:32 PM

Figure 2
Tank 1010 Site Layout
Tank 1010 Interim Measure Summary
Union Carbide Corporation Institute Facility
Institute, West Virginia

ch2m

\\LAKEFRONT\PROJ\GIS\DOW\INSTITUTE\REPORTS\2016\TANK1010INTERIMMEASURESUMMARY\MAPFILES\FIGURE 2_TANK_1010_SITE_LAYOUT.MXD AESPEJO 7/1/2016 3:30:29 PM

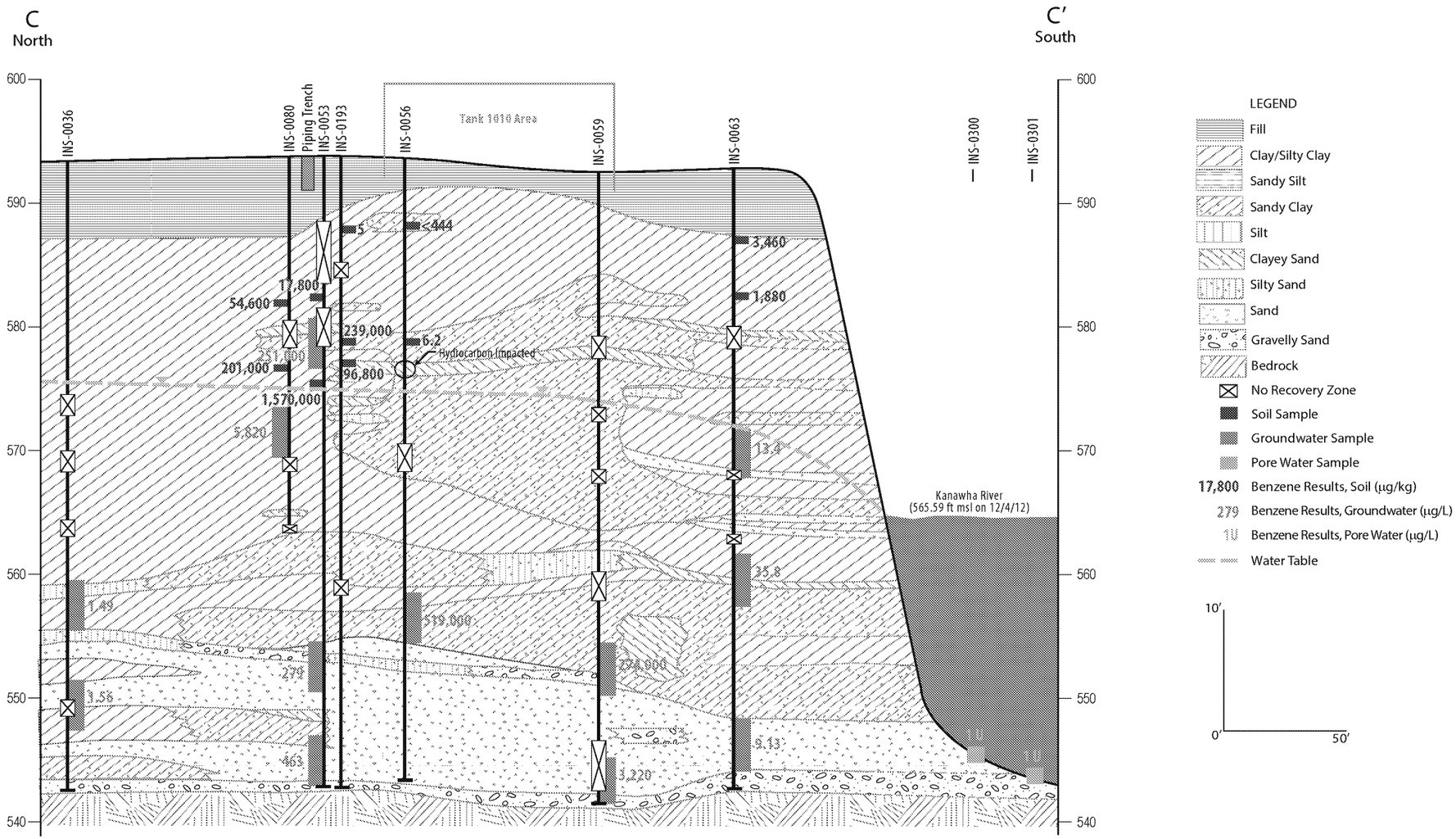


FIGURE 3
Geologic Cross Section C-C'
Tank 1010 Interim Measure Summary
Union Carbide Corporation Institute Facility, Institute, West Virginia

ES082312082908KNV SectionC-C_r4 3/12/13 lk

ch2m:

Figure 4
2014 and 2015 Target Treatment Zones
Tank 1010 Interim Measure Summary
Union Carbide Corporation Institute Facility
Institute, West Virginia

\\LAKEFRONT\PROJ\GIS\DOW\INSTITUTE\REPORTS\2016\TANK1010INTERIMMEASURESUMMARY\MAPFILES\FIGURE 4_2014_AND_2015_TTZ.MXD AESPEJO 10/12/2016 3:53:48 PM

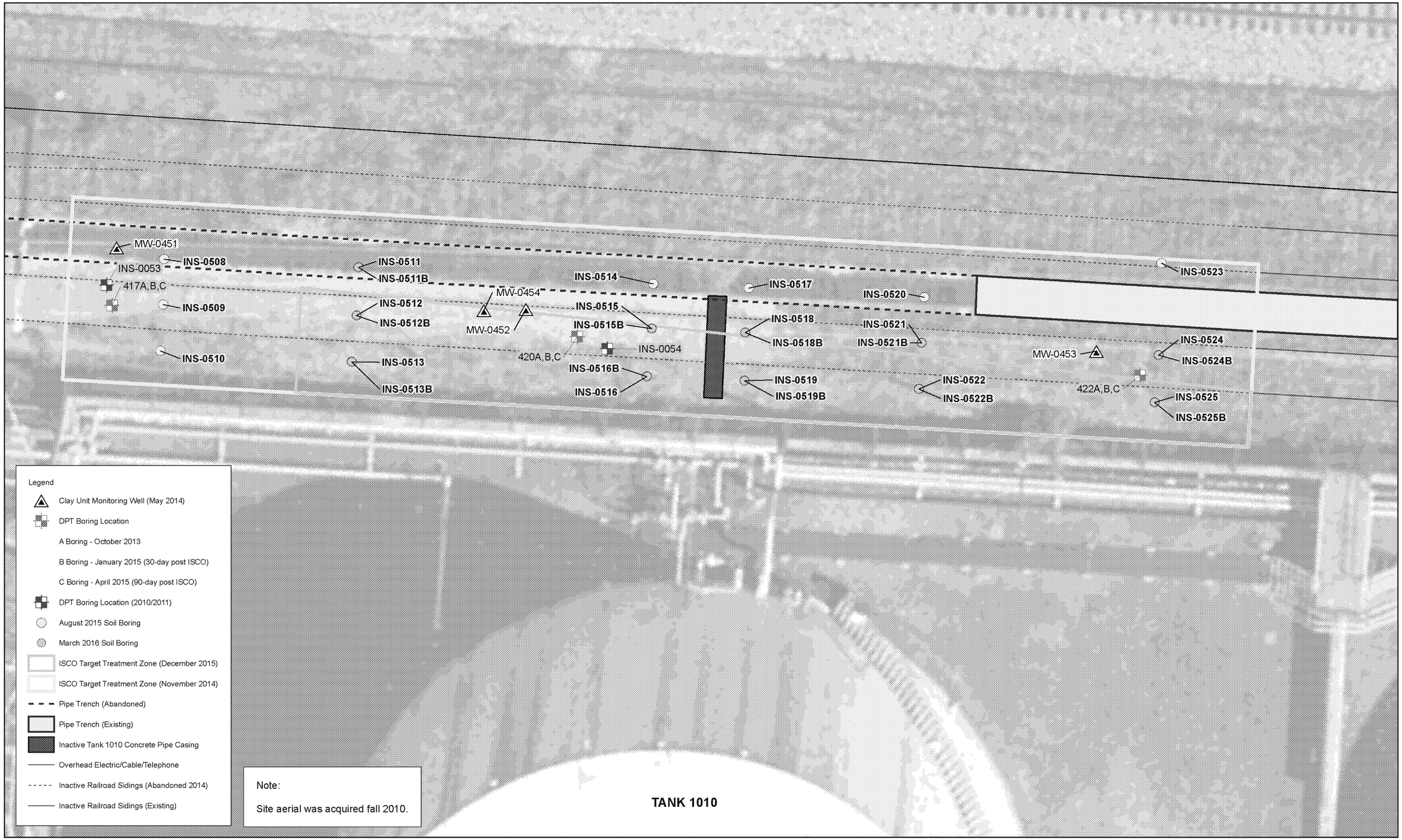


Figure 5
Soil Borings Within 2014 and 2015 Target Treatment Zones
Tank 1010 Interim Measure Summary
Union Carbide Corporation Institute Facility
Institute, West Virginia

MKE - \\lakefront\Proj\GIS\Dow\Institute\Reports\2016\Tank1010InterimMeasureSummary\MapFiles\Figure 5_TTZ_BoringLocs.mxd User Name: AESPEJO Date: 10/12/2016 Time: 3:56:59 PM

Attachment A
2014 DTI Log Phase 1

DOW Tank 1010 - Institute, WV

Cool-Ox®

BATCH INFORMATION			INJECTION DATA		
Date	Batch #	Inj. Pt.	Vert.	Gallons	pH
11/11/2014	1	E-5	35-5	81	8
	2	E-1	35-5	81	8
	3	A-1	35-5	81	8
	4	A-5	35-5	81	8
	5	D-3	35-5	81	8
	6	B-2	35-5	81	8
11/12/2014	7	E-4	35-5	81	8
	8	E-2	35-5	81	8
	9	A-3	35-5	81	8
	10	A-4	35-5	81	8
	11	C-2	35-5	81	8
	12	E-3	35-5	81	8
	13	B-1	35-5	81	8
	14	A-2	35-5	81	8
	15	C-5	35-5	81	8
11/13/2014	16	D-5	35-5	81	8
	17	D-4	35-5	81	8
	18	D-2	35-5	81	8
	19	B-3	35-5	81	8
11/14/2014	20	B-5	35-5	81	8
	21	C-4	35-5	81	8
	22	C-3	35-5	81	8
	23	D-1	35-5	81	8
11/15/2014	24	B-4	5	6.28	8
			7.5	5.83	8
			10	6.01	8
			12.5	5.99	8
			15	9.02	8
			17.5	6.11	8
			20	5.98	8
			22.5	6.03	8
			25	5.99	8
			27.5	6	8
			30	5.87	8
			32.5	6.01	8
			35	5.88	8
	25	C-1	5	5.98	8
			7.5	6.01	8
			10	5.92	8
			12.5	9.04	8
			15	6.22	8
			17.5	5.99	8
			20	6	8
			22.5	6.03	8
			25	5.94	8
			27.5	6.13	8
			30	6.02	8
			32.5	5.99	8
			35	5.73	8
	TOTAL	**25**		**2,025**	

Attachment B
2014 DTI Log Phase 2

DOW Tank 1010 Full Scale Application - Institute, WV

Cool-Ox®

BATCH INFORMATION			INJECTION DATA				
Date	Batch #	IP Name	Vert.	Gallons	pH	Total gal.	IP's
11/15/2014	26	D-4/5	5	6.18	8	30	6
			7.5	5.9	8		
			10	5.98	8		
			12.5	6.03	8		
			15	5.91	8		
	27	D/C-5	5	5.91	8	30.02	
			7.5	6.19	8		
			10	5.92	8		
			12.5	6.02	8		
			15	5.98	8		
	28	G-1	5	6.02	8	81	
			7.5	6.12	8		
			10	5.98	8		
			12.5	9	8		
			15	5.9	8		
			17.5	6.05	8		
			20	5.92	8		
			22.5	5.93	8		
			25	6.07	8		
			27.5	5.96	8		
			30	6.01	8		
			32.5	6.03	8		
			35	6.01	8		
	29	A/B-1	5	6.01	8	81	
			7.5	5.94	8		
			10	6	8		
			12.5	9.18	8		
			15	6.16	8		
			17.5	5.73	8		
			20	5.98	8		
			22.5	6.14	8		
			25	6.1	8		
			27.5	5.83	8		
			30	5.92	8		
			32.5	5.99	8		
			35	6.02	8		
	30	C-4/5	5	5.99	8	30.02	
			7.5	6.01	8		
			10	5.91	8		
			12.5	5.92	8		
			15	6.19	8		
	31	C/D-4	5	6.17	8	30	
			7.5	6.03	8		
			10	5.9	8		
			12.5	5.93	8		
			15	5.97	8		

11/16/2014	32	A/A-2	5	4.61	8	60	4
			7.5	4.63	8		
			10	4.6	8		
			12.5	4.8	8		
			15	4.71	8		
			17.5	4.51	8		
			20	4.44	8		
			22.5	4.63	8		
			25	4.56	8		
			27.5	4.59	8		
			30	4.63	8		
			32.5	4.69	8		
			35	4.6	8		
	33	A/B-3	5	4.6	8	60	
			7.5	4.69	8		
			10	4.64	8		
			12.5	4.58	8		
			15	4.55	8		
			17.5	4.64	8		
			20	4.43	8		
			22.5	4.52	8		
			25	4.71	8		
			27.5	4.81	8		
			30	4.59	8		
			32.5	4.61	8		
			35	4.63	8		
	34	S-5	5	6.28	8	81.02	
			7.5	5.83	8		
			10	6	8		
			12.5	6	8		
			15	9.01	8		
			17.5	6.12	8		
			20	5.98	8		
			22.5	6.04	8		
			25	5.99	8		
			27.5	6.01	8		
			30	5.89	8		
			32.5	5.99	8		
			35	5.88	8		
	35	R-4	5	5.89	8	81	
			7.5	6.26	8		
			10	6.12	8		
			12.5	5.83	8		
			15	8.9	8		
			17.5	5.86	8		
			20	6.11	8		
			22.5	6.09	8		
			25	6.08	8		
			27.5	6.06	8		
			30	6.12	8		
			32.5	5.88	8		

			35	5.8	8		
	36	Q-5	5	5.93	8	80.73	
			7.5	6.17	8		
			10	6	8		
			12.5	9.02	8		
			15	5.97	8		
			17.5	6.02	8		
			20	5.89	8		
			22.5	6.23	8		
			25	5.89	8		
			27.5	5.9	8		
			30	6.1	8		
			32.5	5.6	8		
			35	6.01	8		
	37	P-4	5	6.14	8	80.84	
			7.5	5.79	8		
			10	5.94	8		
			12.5	9.06	8		
			15	6.04	8		
			17.5	5.69	8		
			20	6.02	8		
			22.5	6.18	8		
			25	5.87	8		
			27.5	6.05	8		
			30	6.24	8		
			32.5	5.96	8		
			35	5.86	8		
	38	O-5	5	6	8	81.26	
			7.5	5.88	8		
			10	6.04	8		
			12.5	9.13	8		
			15	6	8		
			17.5	6.12	8		
			20	5.98	8		
			22.5	6	8		
			25	5.99	8		
			27.5	6.13	8		
			30	5.88	8		
			32.5	5.98	8		
			35	6.13	8		
	39	N-4	5	6.1	8	80.97	
			7.5	6	8		
			10	5.98	8		
			12.5	8.83	8		
			15	6.26	8		
			17.5	5.87	8		
			20	6.1	8		
			22.5	6	8		
			25	5.98	8		
			27.5	5.87	8		
			30	5.89	8		

			32.5	6.1	8		
			35	5.99	8		
			5	5.08	8		
			7.5	6.1	8		
			10	5.94	8		
			12.5	9	8		
			15	6.01	8		
			17.5	5.98	8		
11/17/2014	40	M-5	20	5.96	8	80.04	9
			22.5	5.99	8		
			25	6.02	8		
			27.5	6.13	8		
			30	6	8		
			32.5	5.97	8		
			35	5.86	8		
			5	6.02	8		
			7.5	5.97	8		
			10	6.04	8		
			12.5	9.04	8		
			15	6.06	8		
			17.5	5.87	8		
	41	S-4	20	5.81	8	80.9	
			22.5	5.9	8		
			25	6.1	8		
			27.5	6.04	8		
			30	6	8		
			32.5	5.94	8		
			35	6.11	8		
			5	5.87	8		
			7.5	6	8		
			10	6.01	8		
			12.5	9.62	8		
			15	5.73	8		
			17.5	5.82	8		
	42	R-5	20	5.6	8	80.05	
			22.5	5.79	8		
			25	6	8		
			27.5	5.87	8		
			30	5.64	8		
			32.5	6.16	8		
			35	5.94	8		
			5	6.13	8		
			7.5	6	8		
			10	5.98	8		
			12.5	8.87	8		
			15	5.56	8		
			17.5	6	8		
	43	T-5	20	6.13	8	80.64	
			22.5	5.87	8		
			25	6	8		
			27.5	5.98	8		

			30	6.12	8		
			32.5	6.01	8		
			35	5.99	8		
	44	Q-4	5	6.14	8	80.99	
			7.5	5.99	8		
			10	6	8		
			12.5	9.01	8		
			15	6.11	8		
			17.5	5.92	8		
			20	6.06	8		
			22.5	6.02	8		
			25	5.87	8		
			27.5	5.87	8		
			30	6	8		
			32.5	5.91	8		
			35	6.09	8		
	45	U-5	5	5.98	8	81.09	
			7.5	6.03	8		
			10	6.02	8		
			12.5	9.14	8		
			15	5.89	8		
			17.5	5.74	8		
			20	6.14	8		
			22.5	6.04	8		
			25	6.1	8		
			27.5	5.91	8		
			30	6.02	8		
			32.5	5.98	8		
			35	6.1	8		
	46	U-4	5	5.86	8	81.02	
			7.5	6.06	8		
			10	6.1	8		
			12.5	9.1	8		
			15	6.02	8		
			17.5	6.04	8		
			20	6	8		
			22.5	5.99	8		
			25	5.87	8		
			27.5	6.07	8		
			30	6.02	8		
			32.5	5.99	8		
			35	5.9	8		
	47	P-5	5	5.87	8	81.42	
			7.5	6.14	8		
			10	5.96	8		
			12.5	9.11	8		
			15	6.06	8		
			17.5	6.18	8		
			20	5.92	8		
			22.5	6.24	8		
			25	6.01	8		

			27.5	5.98	8		
			30	5.89	8		
			32.5	6	8		
			35	6.06	8		
	48	L-5	5	6.01	8	81.38	
			7.5	5.98	8		
			10	6.58	8		
			12.5	9.07	8		
			15	6.07	8		
			17.5	5.87	8		
			20	5.99	8		
			22.5	6.03	8		
			25	6	8		
			27.5	5.87	8		
			30	5.89	8		
			32.5	6.03	8		
			35	5.99	8		
	49	J-5	5	5.83	8	81.06	
			7.5	5.79	8		
			10	6.24	8		
			12.5	9.02	8		
			15	6.17	8		
			17.5	5.98	8		
			20	5.99	8		
			22.5	6.01	8		
			25	6.03	8		
			27.5	5.99	8		
			30	6.01	8		
			32.5	6.04	8		
11/18/2014			35	5.96	8		10
	50	H-5	5	5.74	8	81.28	
			7.5	5.94	8		
			10	6.08	8		
			12.5	9.1	8		
			15	6.19	8		
			17.5	6.08	8		
			20	5.93	8		
			22.5	6.08	8		
			25	6	8		
			27.5	5.99	8		
			30	6.03	8		
			32.5	5.98	8		
			35	6.14	8		
	51	F-5	5	6.12	8	81.19	
			7.5	5.87	8		
			10	6.01	8		
			12.5	9.04	8		
			15	5.9	8		
			17.5	6.1	8		
			20	6.03	8		
			22.5	5.98	8		

			25	5.94	8		
			27.5	6.01	8		
			30	6.14	8		
			32.5	5.95	8		
			35	6.1	8		
	52	U-2	5	5.84	8	80.87	
			7.5	6.12	8		
			10	6.01	8		
			12.5	9.13	8		
			15	5.94	8		
			17.5	6.05	8		
			20	6.02	8		
			22.5	5.82	8		
			25	5.92	8		
			27.5	5.98	8		
			30	6.03	8		
			32.5	5.94	8		
			35	6.07	8		
	53	S-2	5	6	8	81.33	
			7.5	5.96	8		
			10	6.14	8		
			12.5	9.12	8		
			15	6.1	8		
			17.5	5.98	8		
			20	5.92	8		
			22.5	6.14	8		
			25	6.01	8		
			27.5	5.87	8		
			30	6	8		
			32.5	5.99	8		
			35	6.1	8		
	54	Q-2	5	6.01	8	81.18	
			7.5	5.87	8		
			10	6.12	8		
			12.5	9.03	8		
			15	5.97	8		
			17.5	6.13	8		
			20	5.89	8		
			22.5	5.99	8		
			25	6.01	8		
			27.5	6.04	8		
			30	5.96	8		
			32.5	6.17	8		
			35	5.99	8		
			5	6.04	8		
			7.5	5.92	8		
			10	5.96	8		
			12.5	8.88	8		
			15	6.13	8		
			17.5	5.86	8		
	55	A-D-5	20	6.16	8	80.85	

		22.5	6.12	8	
		25	5.87	8	
		27.5	5.94	8	
		30	5.96	8	
		32.5	6.03	8	
		35	5.98	8	
56	A-F-5	5	6.01	8	81
		7.5	5.94	8	
		10	6.06	8	
		12.5	9.09	8	
		15	5.94	8	
		17.5	5.96	8	
		20	5.98	8	
		22.5	6	8	
		25	6.12	8	
		27.5	5.99	8	
		30	5.87	8	
		32.5	6.01	8	
		35	6.03	8	
57	A-H-5	5	5.89	8	81.01
		7.5	6.14	8	
		10	6.04	8	
		12.5	8.96	8	
		15	6.14	8	
		17.5	6.01	8	
		20	6	8	
		22.5	5.87	8	
		25	5.93	8	
		27.5	6.14	8	
		30	6.01	8	
		32.5	5.89	8	
		35	5.99	8	
58	A-J-5	5	6.01	8	81.14
		7.5	5.89	8	
		10	6.06	8	
		12.5	9.01	8	
		15	6.06	8	
		17.5	5.98	8	
		20	6.14	8	
		22.5	5.99	8	
		25	6	8	
		27.5	6.12	8	
		30	5.91	8	
		32.5	6	8	
		35	5.97	8	
		5	5.98	8	
		7.5	6.03	8	
		10	6.01	8	
		12.5	8.99	8	
		15	6	8	
		17.5	5.99	8	

11/19/2014	59	A-K-3	20	6.01	8	81.08	10
			22.5	5.97	8		
			25	6.12	8		
			27.5	5.97	8		
			30	5.99	8		
			32.5	6.03	8		
			35	5.99	8		
	60	A-I-3	5	6.1	8	81.18	
			7.5	5.98	8		
			10	6	8		
			12.5	9.01	8		
			15	6.04	8		
			17.5	5.93	8		
			20	6.14	8		
			22.5	6.13	8		
			25	5.87	8		
			27.5	5.99	8		
			30	6.01	8		
			32.5	5.87	8		
			35	6.11	8		
	61	A-G-3	5	6.01	8	80.82	
			7.5	5.81	8		
			10	6.03	8		
			12.5	9.14	8		
			15	6.12	8		
			17.5	5.99	8		
			20	5.83	8		
			22.5	6.01	8		
			25	6.01	8		
			27.5	5.81	8		
			30	6	8		
			32.5	5.99	8		
			35	6.07	8		
	62	A-E-3	5	6.02	8	80.84	
			7.5	6.01	8		
			10	6	8		
			12.5	9.01	8		
			15	6.03	8		
			17.5	5.99	8		
			20	5.99	8		
			22.5	6	8		
			25	6.01	8		
			27.5	5.89	8		
			30	6	8		
			32.5	6.02	8		
			35	5.87	8		
			5	6	8		
			7.5	5.98	8		
			10	6.1	8		
			12.5	8.95	8		
			15	5.99	8		

	63	A-c-3	17.5	6.02	8	81.12	
			20	5.98	8		
			22.5	6	8		
			25	5.99	8		
			27.5	6.01	8		
			30	6.13	8		
			32.5	5.8	8		
			35	6.17	8		
	64	A-J-1	5	6.01	8	80.94	
			7.5	6	8		
			10	5.99	8		
			12.5	9.01	8		
			15	6.02	8		
			17.5	5.89	8		
			20	5.99	8		
			22.5	6.02	8		
			25	6	8		
			27.5	5.99	8		
			30	6.03	8		
			32.5	5.87	8		
			35	6.12	8		
	65	A-H-1	5	5.98	8	80.86	
			7.5	6.01	8		
			10	5.99	8		
			12.5	9.01	8		
			15	6	8		
			17.5	6.1	8		
			20	5.99	8		
			22.5	5.89	8		
			25	6	8		
			27.5	6.03	8		
			30	5.97	8		
			32.5	6.02	8		
			35	5.87	8		
	66	A-F-1	5	6	8	81.09	
			7.5	6.01	8		
			10	6	8		
			12.5	8.99	8		
			15	6.01	8		
			17.5	6	8		
			20	5.99	8		
			22.5	6.1	8		
			25	5.98	8		
			27.5	6.01	8		
			30	5.97	8		
			32.5	6	8		
			35	6.03	8		
			5	5.99	8		
			7.5	5.98	8		
			10	6.03	8		
			12.5	9.01	8		

	67	A-D-1	15	6	8	81.13	
			17.5	5.99	8		
			20	6.13	8		
			22.5	6	8		
			25	6.02	8		
			27.5	5.97	8		
			30	6	8		
			32.5	5.89	8		
			35	6.12	8		
	68	A-A-1	5	0		25	
			7.5	6	8		
			10	5.89	8		
			12.5	8.51	8		
			15	0			
			17.5	0			
			20	0			
			22.5	0			
			25	0			
			27.5	0			
			30	0			
			32.5	0			
			35	4.6	8		
	69	F-1	5	6	8	81.22	
			7.5	5.99	8		
			10	6.03	8		
			12.5	9	8		
			15	6.01	8		
			17.5	5.98	8		
			20	5.99	8		
			22.5	6.02	8		
			25	6	8		
			27.5	6	8		
			30	5.99	8		
			32.5	6.01	8		
11/20/2014			35	6.2	8		10
	70	I-1	5	5.99	8	80.94	
			7.5	6.03	8		
			10	5.98	8		
			12.5	9.03	8		
			15	6.11	8		
			17.5	5.87	8		
			20	5.89	8		
			22.5	6	8		
			25	5.98	8		
			27.5	5.93	8		
			30	6.14	8		
			32.5	5.99	8		
			35	6	8		
			5	5.98	8		
			7.5	6.02	8		
			10	5.99	8		

	71	K-1	12.5	9	8	81.04	
			15	6.03	8		
			17.5	6	8		
			20	5.98	8		
			22.5	6.05	8		
			25	6.1	8		
			27.5	5.89	8		
			30	6	8		
			32.5	6	8		
			35	6	8		
	72	M-1	5	5.98	8	80.97	
			7.5	6	8		
			10	5.99	8		
			12.5	9.12	8		
			15	6.01	8		
			17.5	5.99	8		
			20	6	8		
			22.5	5.98	8		
			25	6.02	8		
			27.5	6.01	8		
			30	5.99	8		
			32.5	5.87	8		
			35	6.01	8		
	73	O-1	5	5.96	8	81.03	
			7.5	6.1	8		
			10	5.89	8		
			12.5	9.21	8		
			15	6	8		
			17.5	5.87	8		
			20	5.99	8		
			22.5	6.1	8		
			25	6.01	8		
			27.5	6.01	8		
			30	5.87	8		
			32.5	5.99	8		
			35	6.03	8		
	74	Q-1	5	5.99	8	81.06	
			7.5	6.01	8		
			10	6	8		
			12.5	9.03	8		
			15	5.99	8		
			17.5	6.05	8		
			20	5.99	8		
			22.5	6	8		
			25	5.99	8		
			27.5	6.01	8		
			30	6.03	8		
			32.5	5.99	8		
			35	5.98	8		
			5	5.02	8		
			7.5	5.98	8		

75	U-3	10	5.8	8	81
		12.5	6.12	8	
		15	6.16	8	
		17.5	7.74	8	
		20	6.15	8	
		22.5	7.99	8	
		25	6.08	8	
		27.5	5.78	8	
		30	6	8	
		32.5	6.1	8	
		35	6.08	8	
76	S-3	5	5	8	67.76
		7.5	5.2	8	
		10	5	8	
		12.5	5.15	8	
		15	6	8	
		17.5	5.1	8	
		20	5	8	
		22.5	5.27	8	
		25	5.3	8	
		27.5	5.2	8	
		30	5.1	8	
		32.5	5.17	8	
		35	5.27	8	
77	Q-3	5	5.27	8	68.3
		7.5	5.2	8	
		10	5.3	8	
		12.5	5.25	8	
		15	5.22	8	
		17.5	5.27	8	
		20	5.18	8	
		22.5	5.2	8	
		25	5.14	8	
		27.5	5.27	8	
		30	5.3	8	
		32.5	5.5	8	
		35	5.2	8	
78	O-3	5	5.27		68.36
		7.5	5.2	8	
		10	5.3	8	
		12.5	5.25	8	
		15	5.29		
		17.5	5.31		
		20	5.34		
		22.5	5.2		
		25	5.15		
		27.5	5.2		
		30	5.27		
		32.5	5.28		
		35	5.3	8	
		5	5.2	8	

12/1/2014	79	M-3	7.5	5.27	8	68.18	11
			10	5.3	8		
			12.5	5.22	8		
			15	5.2	8		
			17.5	5.25	8		
			20	5.27	8		
			22.5	5.25	8		
			25	5.2	8		
			27.5	5.3	8		
			30	5.2	8		
			32.5	5.25	8		
			35	5.27	8		
	80	L-3	5	5.27	8	68.51	
			7.5	5.25	8		
			10	5.2	8		
			12.5	5.27	8		
			15	5.25	8		
			17.5	5.2	8		
			20	5.18	8		
			22.5	5.3	8		
			25	5.26	8		
			27.5	5.27	8		
			30	5.2	8		
			32.5	5.3	8		
			35	5.56	8		
	81	J-3	5	5.22	8	67.94	
			7.5	5.2	8		
			10	5.18	8		
			12.5	5.27	8		
			15	5.3	8		
			17.5	5.2	8		
			20	5.18	8		
			22.5	5.22	8		
			25	5.25	8		
			27.5	5.1	8		
			30	5.27	8		
			32.5	5.25	8		
			35	5.3	8		
	82	H-3	5	5.24	8	68.52	
			7.5	5.22	8		
			10	5.7	8		
			12.5	5.3	8		
			15	5.27	8		
			17.5	5.24	8		
			20	5.29	8		
			22.5	5.26	8		
			25	5.22	8		
			27.5	5.25	8		
			30	5.27	8		
			32.5	5.26	8		
			35	5	8		

	83	AK-2	5	5.27	8	67.85
			7.5	5.25	8	
			10	5.2	8	
			12.5	5.22	8	
			15	5.3	8	
			17.5	5.2	8	
			20	5.25	8	
			22.5	5.27	8	
			25	5.3	8	
			27.5	5.18	8	
			30	5.21	8	
			32.5	5.2	8	
			35	5	8	
	84	AI-2	5	5.27	8	68.09
			7.5	5.2	8	
			10	5.1	8	
			12.5	5.11	8	
			15	5.18	8	
			17.5	5.29	8	
			20	5.3	8	
			22.5	5.22	8	
			25	5.26	8	
			27.5	5.27	8	
			30	5.18	8	
			32.5	5.2	8	
			35	5.51	8	
	85	AG-2	5	5.27		68.29
			7.5	5.25		
			10	5.23		
			12.5	5.3		
			15	5.2		
			17.5	5.18		
			20	5.21		
			22.5	5.25		
			25	5.25		
			27.5	5.27		
			30	5.28		
			32.5	5.3		
			35	5.3		
	86	AE-2	5	5.07	8	68.24
			7.5	5.34	8	
			10	5.2	8	
			12.5	5.18	8	
			15	5.27	8	
			17.5	5.26	8	
			20	5.29	8	
			22.5	5.34	8	
			25	5.28	8	
			27.5	5.15	8	
			30	5.31	8	
			32.5	5.28	8	

		35	5.27	8	
87	AC-2	5	5.18	8	68.25
		7.5	5.15	8	
		10	5.22	8	
		12.5	5.28	8	
		15	5.35	8	
		17.5	5.17	8	
		20	5.34	8	
		22.5	5.29	8	
		25	5.28	8	
		27.5	5.27	8	
		30	5.2	8	
		32.5	5.18	8	
		35	5.34	8	
88	M-2	5	5.14	8	67.82
		7.5	5.28	8	
		10	5.23	8	
		12.5	5.18	8	
		15	4.82	8	
		17.5	5.35	8	
		20	5.3	8	
		22.5	5.2	8	
		25	5.28	8	
		27.5	5.26	8	
		30	5.18	8	
		32.5	5.26	8	
		35	5.34	8	
89	K-2	5	5.28		68.86
		7.5	5.32	8	
		10	5.32	8	
		12.5	5.26	8	
		15	5.21		
		17.5	5.32		
		20	5.27		
		22.5	5.16		
		25	5.25		
		27.5	5.32		
		30	5.29		
		32.5	5.32		
		35	5.54	8	
90	I-2	5	5.31	8	68.55
		7.5	5.27	8	
		10	5.29	8	
		12.5	5.27	8	
		15	5.3	8	
		17.5	5.29	8	
		20	5.28	8	
		22.5	5.3	8	
		25	5.32	8	
		27.5	5.27	8	
		30	5.18	8	

			32.5	5.2	8		
			35	5.27	8		
	91	G-2	5	5.23	8	68.55	
			7.5	5.2	8		
			10	5.27	8		
			12.5	5.3	8		
			15	5.2	8		
			17.5	5.32	8		
			20	5.27	8		
			22.5	5.3	8		
			25	5.29	8		
			27.5	5.32	8		
			30	5.27	8		
			32.5	5.28	8		
			35	5.3	8		
12/2/2014	92	AJ-4	5	5.28	8	68.63	12
			7.5	5.26	8		
			10	5.27	8		
			12.5	5.3	8		
			15	5.26	8		
			17.5	5.3	8		
			20	5.32	8		
			22.5	5.28	8		
			25	5.3	8		
			27.5	5.28	8		
			30	5.25	8		
			32.5	5.28	8		
			35	5.25	8		
	93	AH-4	5	5.3	8	68.55	
			7.5	5.23	8		
			10	5.28	8		
			12.5	5.28	8		
			15	5.32	8		
			17.5	5.17	8		
			20	5.29	8		
			22.5	5.27	8		
			25	5.28	8		
			27.5	5.29	8		
			30	5.3	8		
			32.5	5.25	8		
			35	5.29	8		
	94	AF-4	5	5.3	8	68.53	
			7.5	5.31	8		
			10	5.27	8		
			12.5	5.23	8		
			15	5.28	8		
			17.5	5.31	8		
			20	5.25	8		
			22.5	5.3	8		
			25	5.21	8		
			27.5	5.18	8		

			30	5.28	8		
			32.5	5.3	8		
			35	5.31	8		
	95	AD-4	5	5.21	8	68.34	
			7.5	5.18	8		
			10	5.26	8		
			12.5	5.29	8		
			15	5.21	8		
			17.5	5.32	8		
			20	5.27	8		
			22.5	5.3	8		
			25	5.28	8		
			27.5	5.2	8		
			30	5.3	8		
			32.5	5.24	8		
			35	5.28	8		
	96	T-4	5	5.2		68.22	
			7.5	5.29			
			10	5.15			
			12.5	5.32			
			15	5.28			
			17.5	5.29			
			20	5.28			
			22.5	5.3			
			25	5.14			
			27.5	5.19			
			30	5.22			
			32.5	5.27			
			35	5.29			
	97	O-4	5	5.4		68.53	
			7.5	5.15			
			10	5.29			
			12.5	5.26			
			15	5.26			
			17.5	5.3			
			20	5.18			
			22.5	5.29			
			25	5.28			
			27.5	5.27			
			30	5.19			
			32.5	5.32			
			35	5.34			
	98	N-5	5	5.29	8	68.72	
			7.5	5.33	8		
			10	5.3	8		
			12.5	5.24	8		
			15	5.32	8		
			17.5	5.23	8		
			20	5.27	8		
			22.5	5.26	8		
			25	5.34	8		

		27.5	5.27	8	
		30	5.32	8	
		32.5	5.28	8	
		35	5.27	8	
99	M-4	5	5.32	8	68.48
		7.5	5.2	8	
		10	5.27	8	
		12.5	5.26	8	
		15	5.31	8	
		17.5	5.36	8	
		20	5.28	8	
		22.5	5.17	8	
		25	5.32	8	
		27.5	5.27	8	
		30	5.2	8	
		32.5	5.18	8	
		35	5.34	8	
100	K-4	5	5.24	8	68.35
		7.5	5.28	8	
		10	5.32	8	
		12.5	5.28	8	
		15	5.21	8	
		17.5	5.33	8	
		20	5.26	8	
		22.5	5.29	8	
		25	5.2	8	
		27.5	5.16	8	
		30	5.18	8	
		32.5	5.26	8	
		35	5.34	8	
101	I-4	5	5.21		68.07
		7.5	5.15	8	
		10	5.25	8	
		12.5	5.21	8	
		15	5.25		
		17.5	5.29		
		20	5.18		
		22.5	5.28		
		25	5.1		
		27.5	5.27		
		30	5.28		
		32.5	5.32		
		35	5.28	8	
102	G-4	5	5.31	8	68.58
		7.5	5.27	8	
		10	5.27	8	
		12.5	5.4	8	
		15	5.18	8	
		17.5	5.32	8	
		20	5.2	8	
		22.5	5.27	8	

			25	5.32	8		
			27.5	5.25	8		
			30	5.28	8		
			32.5	5.25	8		
			35	5.26	8		
	103	AK-1	5	5.23	8	68.34	
			7.5	5.32	8		
			10	5.28	8		
			12.5	5.27	8		
			15	5.2	8		
			17.5	5.29	8		
			20	5.18	8		
			22.5	5.25	8		
			25	5.29	8		
			27.5	5.3	8		
			30	5.28	8		
			32.5	5.27	8		
			35	5.18	8		
	104	AI-1	5	5.29	8	68.4	
			7.5	5.25	8		
			10	5.3	8		
			12.5	5.27	8		
			15	5.33	8		
			17.5	5.21	8		
			20	5.27	8		
			22.5	5.27	8		
			25	5.28	8		
			27.5	5.28	8		
			30	5.1	8		
			32.5	5.3	8		
			35	5.25	8		
	105	AG-1	5	5.34	8	68.25	
			7.5	5.26	8		
			10	5.27	8		
			12.5	5.3	8		
			15	5.27	8		
			17.5	5.17	8		
12/3/2014			20	5.21	8		15
			22.5	5.29	8		
			25	5.29	8		
			27.5	5.32	8		
			30	5.25	8		
			32.5	5.18	8		
			35	5.1	8		
	106	AE-1	5	5.34	8	68.46	
			7.5	5.25	8		
			10	5.27	8		
			12.5	5.23	8		
			15	5.31	8		
			17.5	5.27	8		
			20	5.22	8		

		22.5	5.18	8	
		25	5.25	8	
		27.5	5.4	8	
		30	5.26	8	
		32.5	5.28	8	
		35	5.2	8	
107	AC-1	5	5.14	8	67.95
		7.5	5.21	8	
		10	5.32	8	
		12.5	5.34	8	
		15	5.29	8	
		17.5	5.22	8	
		20	5.18	8	
		22.5	5.1	8	
		25	5.24	8	
		27.5	5.14	8	
		30	5.3	8	
		32.5	5.24	8	
		35	5.23	8	
108	H-1	5	5.32		68.49
		7.5	5.22		
		10	5.32		
		12.5	5.27		
		15	5.15		
		17.5	5.3		
		20	5.28		
		22.5	5.24		
		25	5.31		
		27.5	5.27		
		30	5.28		
		32.5	5.26		
		35	5.27		
109	J-1	5	5.23		68.29
		7.5	5.37		
		10	5.18		
		12.5	5.26		
		15	5.27		
		17.5	5.34		
		20	5.18		
		22.5	5.2		
		25	5.14		
		27.5	5.27		
		30	5.22		
		32.5	5.23		
		35	5.4		
		5	5.29		
		7.5	5.33		
		10	5.46		
		12.5	5.27		
		15	5.25		
		17.5	5.27		

	110	L-1	20	5.27		68.69	
			22.5	5.21			
			25	5.34			
			27.5	5.27			
			30	5.22			
			32.5	5.23			
			35	5.28			
	111	N-1	5	5.23		68.45	
			7.5	5.27			
			10	5.28			
			12.5	5.22			
			15	5.23			
			17.5	5.24			
			20	5.26			
			22.5	5.27			
			25	5.29			
			27.5	5.3			
			30	5.25			
			32.5	5.27			
			35	5.34			
	112	F-4	5	5.18		68.54	
			7.5	5.1			
			10	5.22			
			12.5	5.26			
			15	5.17			
			17.5	5.92			
			20	5.14			
			22.5	5.27			
			25	5.26			
			27.5	5.24			
			30	5.27			
			32.5	5.26			
			35	5.25			
	113	AJ-2	5	5.25	8	68.34	
			7.5	5.3	8		
			10	5.26	8		
			12.5	5.32	8		
			15	5.27	8		
			17.5	5.23	8		
			20	5.28	8		
			22.5	5.3	8		
			25	5.31	8		
			27.5	5.21	8		
			30	5.27	8		
			32.5	5.34	8		
			35	5	8		
			5	5.24	8		
			7.5	5.26	8		
			10	5.3	8		
			12.5	5.27	8		
			15	5.2	8		

	114	AH-2	17.5	5.26	8	68.28
			20	5.3	8	
			22.5	5.17	8	
			25	5.26	8	
			27.5	5.2	8	
			30	5.25	8	
			32.5	5.27	8	
			35	5.3	8	
	115	AF-2	5	5.32	8	68.61
			7.5	5.28	8	
			10	5.27	8	
			12.5	5.17	8	
			15	5.35	8	
			17.5	5.28	8	
			20	5.32	8	
			22.5	5.33	8	
			25	5.28	8	
			27.5	5.18	8	
			30	5.27	8	
			32.5	5.22	8	
			35	5.34	8	
	116	AH-3	5	5.18		68.39
			7.5	5.27	8	
			10	5.27	8	
			12.5	5.25	8	
			15	5.3		
			17.5	5.38		
			20	5.24		
			22.5	5.22		
			25	5.17		
			27.5	5.33		
			30	5.24		
			32.5	5.26		
			35	5.28	8	
	117	AD-2	5	5.16	8	68.5
			7.5	5.27	8	
			10	5.24	8	
			12.5	5.3	8	
			15	5.32	8	
			17.5	5.28	8	
			20	5.29	8	
			22.5	5.28	8	
			25	5.24	8	
			27.5	5.28	8	
			30	5.28	8	
			32.5	5.26	8	
			35	5.3	8	
			5	5.15	8	
			7.5	5.27	8	
			10	5.32	8	
			12.5	5.3	8	

	118	AB-2	15	5.27	8	68.45	
			17.5	5.24	8		
			20	5.22	8		
			22.5	5.23	8		
			25	5.24	8		
			27.5	5.28	8		
			30	5.27	8		
			32.5	5.32	8		
			35	5.34	8		
	119	T-3	5	5.32	8	68.51	
			7.5	5.42	8		
			10	5.23	8		
			12.5	5.23	8		
			15	5.27	8		
			17.5	5.32	8		
			20	5.24	8		
			22.5	5.18	8		
			25	5.26	8		
			27.5	5.27	8		
			30	5.24	8		
			32.5	5.26	8		
			35	5.27	8		
12/4/2014	120	R-3	5	5.21	8	68.22	15
			7.5	5.21	8		
			10	5.3	8		
			12.5	5.18	8		
			15	5.34	8		
			17.5	5.28	8		
			20	5.18	8		
			22.5	5.27	8		
			25	5.24	8		
			27.5	5.28	8		
			30	5.32	8		
			32.5	5.14	8		
			35	5.27	8		
	121	P-3	5	5.25	8	68.25	
			7.5	5.32	8		
			10	5.2	8		
			12.5	5.18	8		
			15	5.27	8		
			17.5	5.19	8		
			20	5.3	8		
			22.5	5.26	8		
			25	5.27	8		
			27.5	5.32	8		
			30	5.14	8		
			32.5	5.28	8		
			35	5.27	8		
			5	5.22	8		
			7.5	5.29	8		
			10	5.34	8		

	122	N-3	12.5	5.3	8	68.6
			15	5.29	8	
			17.5	5.27	8	
			20	5.32	8	
			22.5	5.27	8	
			25	5.27	8	
			27.5	5.26	8	
			30	5.24	8	
			32.5	5.25	8	
			35	5.28	8	
	123	U-1	5	5.16		68.18
			7.5	5.15		
			10	5.3		
			12.5	5.24		
			15	5.2		
			17.5	5.27		
			20	5.32		
			22.5	5.27		
			25	5.28		
			27.5	5.22		
			30	5.24		
			32.5	5.25		
			35	5.28		
	124	T-1	5	5.29		68.16
			7.5	5.27		
			10	5.22		
			12.5	5.18		
			15	5.24		
			17.5	5.18		
			20	5.3		
			22.5	5.19		
			25	5.2		
			27.5	5.27		
			30	5.27		
			32.5	5.26		
			35	5.29		
	125	S-1	5	5.27		68.38
			7.5	5.28		
			10	5.16		
			12.5	5.26		
			15	5.26		
			17.5	5.3		
			20	5.26		
			22.5	5.27		
			25	5.32		
			27.5	5.3		
			30	5.16		
			32.5	5.27		
			35	5.27		
			5	5.36		
			7.5	5.26		

	126	P-1	10	5.28		65.71	
			12.5	5.29			
			15	5.31			
			17.5	5.28			
			20	2.26			
			22.5	5.24			
			25	5.32			
			27.5	5.3			
			30	5.27			
			32.5	5.26			
			35	5.28			
	127	L-2	5	5.26		68.27	
			7.5	5.29			
			10	5.3			
			12.5	5.23			
			15	5.28			
			17.5	5.25			
			20	5.15			
			22.5	5.27			
			25	5.28			
			27.5	5.26			
			30	5.24			
			32.5	5.2			
			35	5.26			
	128	AJ-3	5	5.27	8	68.45	
			7.5	5.35	8		
			10	5.24	8		
			12.5	5.16	8		
			15	5.24	8		
			17.5	5.28	8		
			20	5.23	8		
			22.5	5.27	8		
			25	5.27	8		
			27.5	5.27	8		
			30	5.26	8		
			32.5	5.29	8		
			35	5.32	8		
	129	AF-3	5	5.24	8	68.43	
			7.5	5.29	8		
			10	5.27	8		
			12.5	5.16	8		
			15	5.27	8		
			17.5	5.28	8		
			20	5.32	8		
			22.5	5.28	8		
			25	5.27	8		
			27.5	5.27	8		
			30	5.24	8		
			32.5	5.26	8		
			35	5.28	8		
			5	5.31	8		

130	AD-3	7.5	5.26	8	68.49
		10	5.28	8	
		12.5	5.27	8	
		15	5.23	8	
		17.5	5.23	8	
		20	5.22	8	
		22.5	5.25	8	
		25	5.27	8	
		27.5	5.27	8	
		30	5.4	8	
		32.5	5.32	8	
		35	5.18	8	
131	AA-3	5	5.24		68.15
		7.5	5.27	8	
		10	5.25	8	
		12.5	5.24	8	
		15	5.32		
		17.5	5.18		
		20	5.22		
		22.5	5.26		
		25	5.18		
		27.5	5.27		
		30	5.24		
		32.5	5.23		
		35	5.25	8	
132	F-3	5	5.27	8	68.32
		7.5	5.24	8	
		10	5.26	8	
		12.5	5.27	8	
		15	5.28	8	
		17.5	5.26	8	
		20	5.32	8	
		22.5	5.16	8	
		25	5.24	8	
		27.5	5.25	8	
		30	5.26	8	
		32.5	5.23	8	
		35	5.28	8	
133	G-3	5	5.14	8	68.11
		7.5	5.12	8	
		10	5.17	8	
		12.5	5.29	8	
		15	5.25	8	
		17.5	5.29	8	
		20	5.4	8	
		22.5	5.26	8	
		25	5.28	8	
		27.5	5.27	8	
		30	5.23	8	
		32.5	5.2	8	
		35	5.21	8	

12/5/2014	134	I-3	5	5.16	8	68.06	15
			7.5	5.1	8		
			10	5.19	8		
			12.5	5.22	8		
			15	5.24	8		
			17.5	5.26	8		
			20	5.27	8		
			22.5	5.28	8		
			25	5.27	8		
			27.5	5.24	8		
			30	5.27	8		
			32.5	5.27	8		
			35	5.29	8		
	135	K-3	5	5.24	8	68.2	
			7.5	5.21	8		
			10	5.18	8		
			12.5	5.29	8		
			15	5.17	8		
			17.5	5.28	8		
			20	5.18	8		
			22.5	5.28	8		
			25	5.42	8		
			27.5	5.24	8		
			30	5.27	8		
			32.5	5.24	8		
			35	5.2	8		
	136	R-1	5	5.18	8	68	
			7.5	5.27	8		
			10	5.24	8		
			12.5	5.3	8		
			15	5.1	8		
			17.5	5.14	8		
			20	5.26	8		
			22.5	5.25	8		
			25	5.27	8		
			27.5	5.28	8		
			30	5.18	8		
			32.5	5.28	8		
			35	5.25	8		
	137	T-2	5	5.21	8	68.29	
			7.5	5.47	8		
			10	5.25	8		
			12.5	5.25	8		
			15	5.28	8		
			17.5	5.24	8		
			20	5.28	8		
			22.5	5.28	8		
			25	5.17	8		
			27.5	5.1	8		
			30	5.22	8		
			32.5	5.27	8		

		35	5.27	8	
138	R-2	5	5.21		68.17
		7.5	5.24		
		10	5.29		
		12.5	5.16		
		15	5.27		
		17.5	5.2		
		20	5.27		
		22.5	5.23		
		25	5.32		
		27.5	5.22		
		30	5.24		
		32.5	5.24		
		35	5.28		
139	P-2	5	5.4		68.39
		7.5	5.23		
		10	5.25		
		12.5	5.31		
		15	5.23		
		17.5	5.18		
		20	5.21		
		22.5	5.27		
		25	5.24		
		27.5	5.27		
		30	5.25		
		32.5	5.26		
		35	5.29		
140	O-2	5	5.21		68.15
		7.5	5.2		
		10	5.24		
		12.5	5.2		
		15	5.28		
		17.5	5.21		
		20	5.26		
		22.5	5.27		
		25	5.26		
		27.5	5.27		
		30	5.27		
		32.5	5.24		
		35	5.24		
141	N-2	5	5.26		68.12
		7.5	5.22		
		10	5.26		
		12.5	5.1		
		15	5.27		
		17.5	5.27		
		20	5.34		
		22.5	5.28		
		25	5.16		
		27.5	5.22		
		30	5.27		

			32.5	5.33			
			35	5.14			
	142	J-2	5	5.25		68.37	
			7.5	5.42			
			10	5.31			
			12.5	5.24			
			15	5.22			
			17.5	5.26			
			20	5.26			
			22.5	5.32			
			25	5.22			
			27.5	5.24			
			30	5.13			
			32.5	5.24			
			35	5.26			
	143	AK-5	5	5.27	8	68.33	
			7.5	5.23	8		
			10	5.28	8		
			12.5	5.26	8		
			15	5.11	8		
			17.5	5.24	8		
			20	5.27	8		
			22.5	5.22	8		
			25	5.32	8		
			27.5	5.26	8		
			30	5.29	8		
			32.5	5.31	8		
			35	5.27	8		
	144	AI-5	5	5.25	8	68.46	
			7.5	5.28	8		
			10	5.27	8		
			12.5	5.26	8		
			15	5.3	8		
			17.5	5.28	8		
			20	5.25	8		
			22.5	5.29	8		
			25	5.31	8		
			27.5	5.27	8		
			30	5.14	8		
			32.5	5.26	8		
			35	5.3	8		
	145	AG-5	5	5.33	8	68.43	
			7.5	5.32	8		
			10	5.28	8		
			12.5	5.24	8		
			15	5.23	8		
			17.5	5.14	8		
			20	5.23	8		
			22.5	5.24	8		
			25	5.27	8		
			27.5	5.29	8		

		30	5.32	8	
		32.5	5.26	8	
		35	5.28	8	
146	AE-5	5	5.3		68.49
		7.5	5.2	8	
		10	5.28	8	
		12.5	5.27	8	
		15	5.32		
		17.5	5.42		
		20	5.22		
		22.5	5.25		
		25	5.19		
		27.5	5.27		
		30	5.25		
		32.5	5.26		
		35	5.26	8	
147	AC-5	5	5.26	8	68.35
		7.5	5.24	8	
		10	5.14	8	
		12.5	5.2	8	
		15	5.23	8	
		17.5	5.5	8	
		20	5.18	8	
		22.5	5.23	8	
		25	5.27	8	
		27.5	5.29	8	
		30	5.26	8	
		32.5	5.28	8	
		35	5.27	8	
148	AB-5	5	5.24	8	68.3
		7.5	5.3	8	
		10	5.25	8	
		12.5	5.28	8	
		15	5.24	8	
		17.5	5.18	8	
		20	5.27	8	
		22.5	5.24	8	
		25	5.21	8	
		27.5	5.2	8	
		30	5.33	8	
		32.5	5.25	8	
		35	5.31	8	
149	AA-5	5	5.29	8	68.49
		7.5	5.28	8	
		10	5.25	8	
		12.5	5.32	8	
		15	5.27	8	
		17.5	5.14	8	
		20	5.21	8	
		22.5	5.29	8	
		25	5.27	8	

			27.5	5.23	8		
			30	5.31	8		
			32.5	5.33	8		
			35	5.3	8		
	150	G-5	5	5.22	8	68.3	
			7.5	5.4	8		
			10	5.25	8		
			12.5	5.13	8		
			15	5.18	8		
			17.5	5.24	8		
			20	5.26	8		
			22.5	5.25	8		
			25	5.24	8		
			27.5	5.24	8		
			30	5.31	8		
			32.5	5.28	8		
			35	5.3	8		
12/7/2014	151	I-5	5	5.09	8	68.11	17
			7.5	5.29	8		
			10	5.27	8		
			12.5	5.29	8		
			15	5.22	8		
			17.5	5.29	8		
			20	5.24	8		
			22.5	5.27	8		
			25	5.25	8		
			27.5	5.27	8		
			30	5.16	8		
			32.5	5.23	8		
			35	5.24	8		
	152	K-5	5	5.22	8	68.39	
			7.5	5.24	8		
			10	5.24	8		
			12.5	5.32	8		
			15	5.24	8		
			17.5	5.32	8		
			20	5.31	8		
			22.5	5.18	8		
			25	5.23	8		
			27.5	5.3	8		
			30	5.27	8		
			32.5	5.25	8		
			35	5.27	8		
	153	F-2	5	5.26		68.39	
			7.5	5.24			
			10	5.21			
			12.5	5.3			
			15	5.29			
			17.5	5.24			
			20	5.3			
			22.5	5.32			

			25	5.26		
			27.5	5.28		
			30	5.2		
			32.5	5.27		
			35	5.22		
	154	AB-4	5	5.31		68.38
			7.5	5.32		
			10	5.24		
			12.5	5.21		
			15	5.25		
			17.5	5.3		
			20	5.16		
			22.5	5.29		
			25	5.26		
			27.5	5.27		
			30	5.23		
			32.5	5.27		
			35	5.27		
	155	H-2	5	5.23		68.32
			7.5	5.29		
			10	5.27		
			12.5	5.26		
			15	5.27		
			17.5	5.27		
			20	5.27		
			22.5	5.32		
			25	5.24		
			27.5	5.22		
			30	5.26		
			32.5	5.18		
			35	5.24		
	156	AK-4	5	5.22		68.46
			7.5	5.29		
			10	5.32		
			12.5	5.26		
			15	5.28		
			17.5	5.28		
			20	5.18		
			22.5	5.29		
			25	5.27		
			27.5	5.25		
			30	5.26		
			32.5	5.27		
			35	5.29		
	157	AI-4	5	5.35		68.61
			7.5	5.27		
			10	5.28		
			12.5	5.26		
			15	5.29		
			17.5	5.31		
			20	5.28		

			22.5	5.27			
			25	5.26			
			27.5	5.24			
			30	5.26			
			32.5	5.26			
			35	5.28			
	158	AG-4	5	5.24		68.31	
			7.5	5.26			
			10	5.21			
			12.5	5.26			
			15	5.24			
			17.5	5.26			
			20	5.29			
			22.5	5.23			
			25	5.27			
			27.5	5.28			
			30	5.28			
			32.5	5.24			
			35	5.25			
	159	AC-4	5	5.7		68.92	
			7.5	5.29			
			10	5.32			
			12.5	5.26			
			15	5.27			
			17.5	5.28			
			20	5.28			
			22.5	5.22			
			25	5.23			
			27.5	5.27			
			30	5.27			
			32.5	5.26			
			35	5.27			
	160	AE-4	5	5.18	8	68.29	
			7.5	5.21	8		
			10	5.24	8		
			12.5	5.23	8		
			15	5.28	8		
			17.5	5.24	8		
			20	5.26	8		
			22.5	5.27	8		
			25	5.22	8		
			27.5	5.32	8		
			30	5.26	8		
			32.5	5.27	8		
			35	5.31	8		
			5	5.32	8		
			7.5	5.26	8		
			10	5.23	8		
			12.5	5.18	8		
			15	5.27	8		
			17.5	5.24	8		

	161	AA-4	20	5.26	8	68.26	
			22.5	5.27	8		
			25	5.31	8		
			27.5	5.28	8		
			30	5.18	8		
			32.5	5.2	8		
			35	5.26	8		
	162	H-4	5	5.28	8	68.49	5
			7.5	5.21	8		
			10	5.27	8		
			12.5	5.26	8		
			15	5.21	8		
			17.5	5.35	8		
12/8/2014			20	5.27	8		
			22.5	5.28	8		
			25	5.32	8		
			27.5	5.28	8		
			30	5.26	8		
			32.5	5.24	8		
			35	5.26	8		
	163	J-4	5	5.25		68.16	
			7.5	5.28	8		
			10	5.21	8		
			12.5	5.28	8		
			15	5.27			
			17.5	5.22			
			20	5.25			
			22.5	5.25			
			25	5.16			
			27.5	5.22			
			30	5.24			
			32.5	5.27			
			35	5.26	8		
	164	L-4	5	5.27	8	68.54	
			7.5	5.32	8		
			10	5.28	8		
			12.5	5.24	8		
			15	5.26	8		
			17.5	5.28	8		
			20	5.19	8		
			22.5	5.32	8		
			25	5.26	8		
			27.5	5.34	8		
			30	5.27	8		
			32.5	5.32	8		
			35	5.19	8		
	TOTAL	**139**		**9827.88**		**9827.88**	**139**

Remaining:	**0**	**0**
Additional:	**1**	?
Design for 4 gal/cy at		

4 ft. Inject. Pt. Spacing	138	9778

Goal: Average 68.5 gallons per IP

Design:	9778	138

Date	Gallons	IP's
11/15/2014	282.04	6
11/16/2014	282.02	4
11/17/2014	726.42	9
11/18/2014	811.82	10
11/19/2014	809.98	10
11/20/2014	754.34	10
12/1/2014	762.8	11
12/2/2014	821.07	12
12/3/2014	1026.06	15
12/4/2014	1022.85	15
12/5/2014	1023.7	15
12/7/2014	1163.04	17
12/8/2014	341.74	5
TOTAL	**9827.88**	**139**

Attachment C
2015 DTI Injection Log

Attachment C - 2015 DTI Injection Log

Cool-Ox®

Cool-Ox® Field Injection Summary									
Client:	**CH2M HILL**			**Date:**	12/9/2010		**DTI Project #:**	2087	
Office:	Atlanta, GA			**Client Personel:**	Jeffrey C. Haberl, R.G.		**Client Project #:**	**669165**	
Site:	**DOW Tank 1010**			**DTI Operations Manager:**	James Gainey		**Subcontract #:**	10381-7-109897	
Location:	Institute, WV			**DTI Field Crew:**	Eric Lundy, Mark Serna, Jason Keprios				
Estimated Work Days:	40								
QUOTE:	**Area (sft):**	**Vertical (ft.**	**Cubic Yards**	**IP Spacing (ft.)**	**Est. Total Gals**	**Gal/cy**	**Est. No. of IP's**	**Estimated IP's/Day**	
	954	10 to 20	353	3 (Rows A & B) and 4	2,100	4	90	9	
					Actual		Actual		
					2,100		90		

INJECTION DATA				
Date	**IP #**	**Gallons**	**pH**	**IP Spacing**
12/9/2015	B-18	20	8	3
	C-15	30	8	4
	B-14	20	8	3
	C-11	30	8	4
	A-9	20	8	3
	C-8	30	8	4
	A-4	20	8	3
	C-4	30	8	4
	A-21	20	8	3
	C-17	30	8	4
	A-16	20	8	3
	C-13	30	8	4
	A-12	20	8	3
	C-10	30	8	4
	A-6	20	8	3
	C-6	30	8	4
	B-33	20	8	3
	B-31	20	8	3
	B-29	20	8	3
	B-27	20	8	3
	B-25	20	8	3
12/9/15 Total	21	500		
12/10/2015	B-23	20	8	3
	B-21	20	8	3
	B-19	20	8	3
	B-17	20	8	3
	B-13	20	8	3
	B-11	20	8	3
	C-9	30	8	4
	B-9	20	8	3
	C-7	30	8	4
	A-5	20	8	3
	C-5	30	8	4
	B-2	30	8	3
12/10/15 Total	12	280		
12/11/2015	B-6	20	8	3
	B-3	30	8	3
	A-7	20	8	3
	C-2	30	8	4
	B-4	20	8	3
	D-1	30	8	4
	B-5	20	8	3
	B-1	30	8	3
	B-7	20	8	3
	A-3	30	8	3
	B-8	20	8	3
	D-3	30	8	4
12/11/15 Total	12	300		
12/12/2015	A-32	20	8	3
	A-30	20	8	3
	A-28	20	8	3
	A-26	20	8	3
	A-24	20	8	3
	A-22	20	8	3
	A-20	20	8	3
	A-18	20	8	3
	B-16	20	8	3
	A-14	20	8	3
	A-13	20	8	3
	A-11	20	8	3
12/12/15 Total	12	240		

Cool-Ox®

Cool-Ox® Field Injection Summary

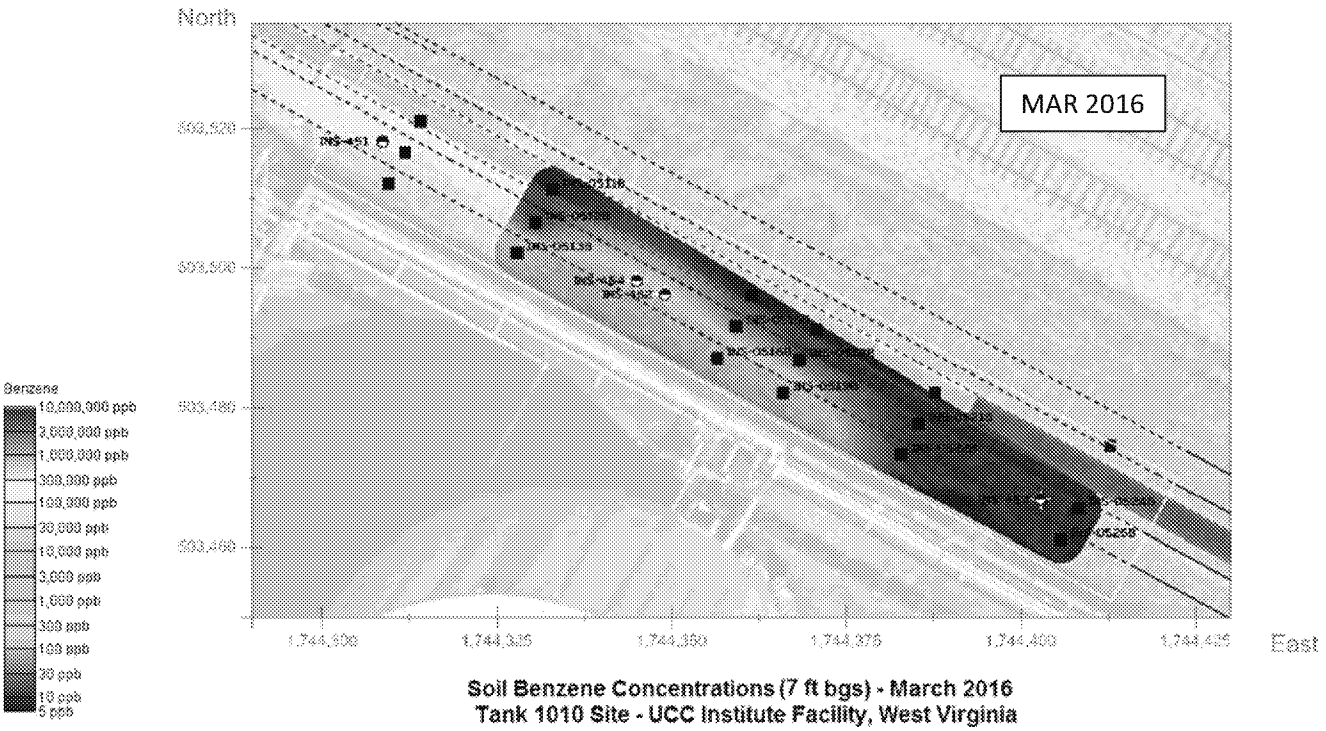
Client:	**CH2M HILL**	**Date:**	12/9/2010	**DTI Project #:**	2087
Office:	Atlanta, GA	**Client Personel:**	Jeffrey C. Haberl, R.G.	**Client Project #:**	**669165**
Site:	**DOW Tank 1010**	**DTI Operations Manager:**	James Gainey	**Subcontract #:**	10381-7-109897
Location:	Institute, WV	**DTI Field Crew:**	Eric Lundy, Mark Serna, Jason Keprios		
Estimated Work Days:	40				

QUOTE:	Area (sft):	Vertical (ft.	Cubic Yards	IP Spacing (ft.)	Est. Total Gals	Gal/cy	Est. No. of IP's	Estimated IP's/Day
	954	10 to 20	353	3 (Rows A & B) and 4	2,100	4	90	9
					Actual		Actual	
					2,100		90	

INJECTION DATA				
Date	**IP #**	**Gallons**	**pH**	**IP Spacing**
12/13/2015	B-32	20	8	3
	B-30	20	8	3
	B-28	20	8	3
	B-26	20	8	3
	B-24	20	8	3
	B-22	20	8	3
	B-20	20	8	3
	B-12	20	8	3
	B-10	20	8	3
	A-1	30	8	3
	A-2	30	8	3
	C-1	30	8	4
	D-2	30	8	4
12/13/15 Total	13	300		
12/14/2015	C-23	30	8	4
	C-21	30	8	4
	C-19	30	8	4
	C-18	30	8	4
	C-16	30	8	4
	C-14	30	8	4
	A-33	20	8	3
	A-31	20	8	3
	A-29	20	8	3
12/14/15 Total	9	240		
12/15/2015	A-27	20	8	3
	A-25	20	8	3
	A-23	20	8	3
	A-19	20	8	3
	A-17	20	8	3
	A-10	20	8	3
	A-8	20	8	3
	C-3	20	8	4
	D-4	20	8	4
	C-22	30	8	4
	C-20	30	8	4
12/15/15 Total	11	240		
GRAND TOTAL	**90**	**2100**		

Attachment D
MVS Images

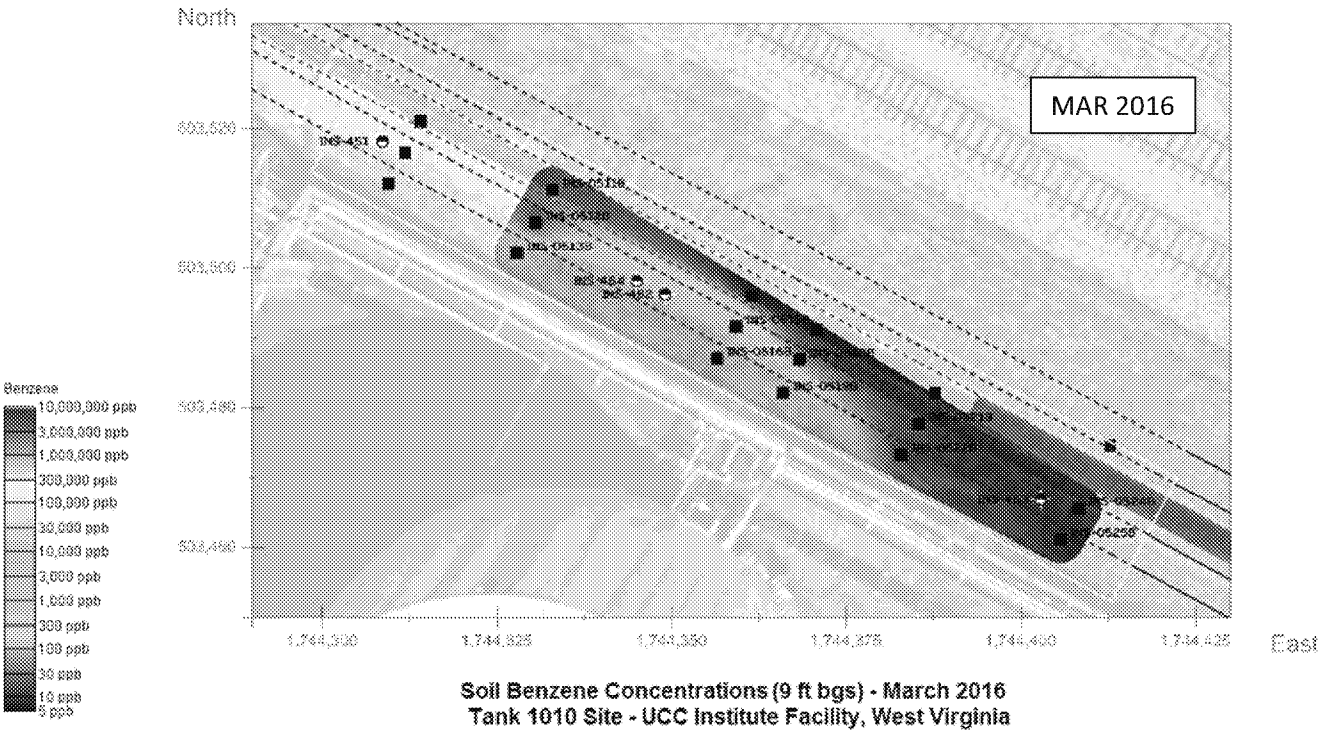
COMPARISON OF MARCH 2016 TO AUGUST 2015 MVS SLICE PLANES
BENZENE CONCENTRATIONS IN SOIL (PPB)



Soil Benzene Concentrations (7 ft bgs) - March 2016
Tank 1010 Site - UCC Institute Facility, West Virginia

Soil Benzene Concentrations (7 ft bgs)
Union Carbide Corporation Institute Facility

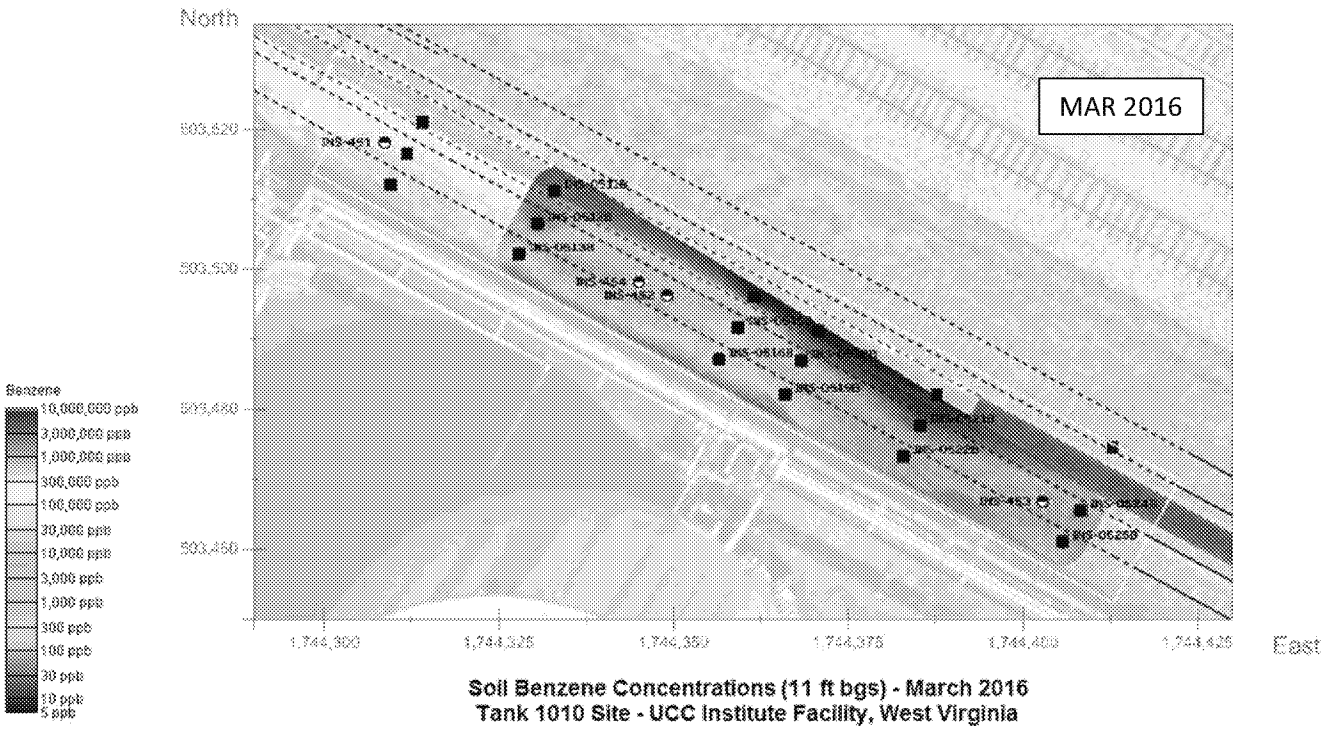
COMPARISON OF MARCH 2016 TO AUGUST 2015 MVS SLICE PLANES
BENZENE CONCENTRATIONS IN SOIL (PPB)



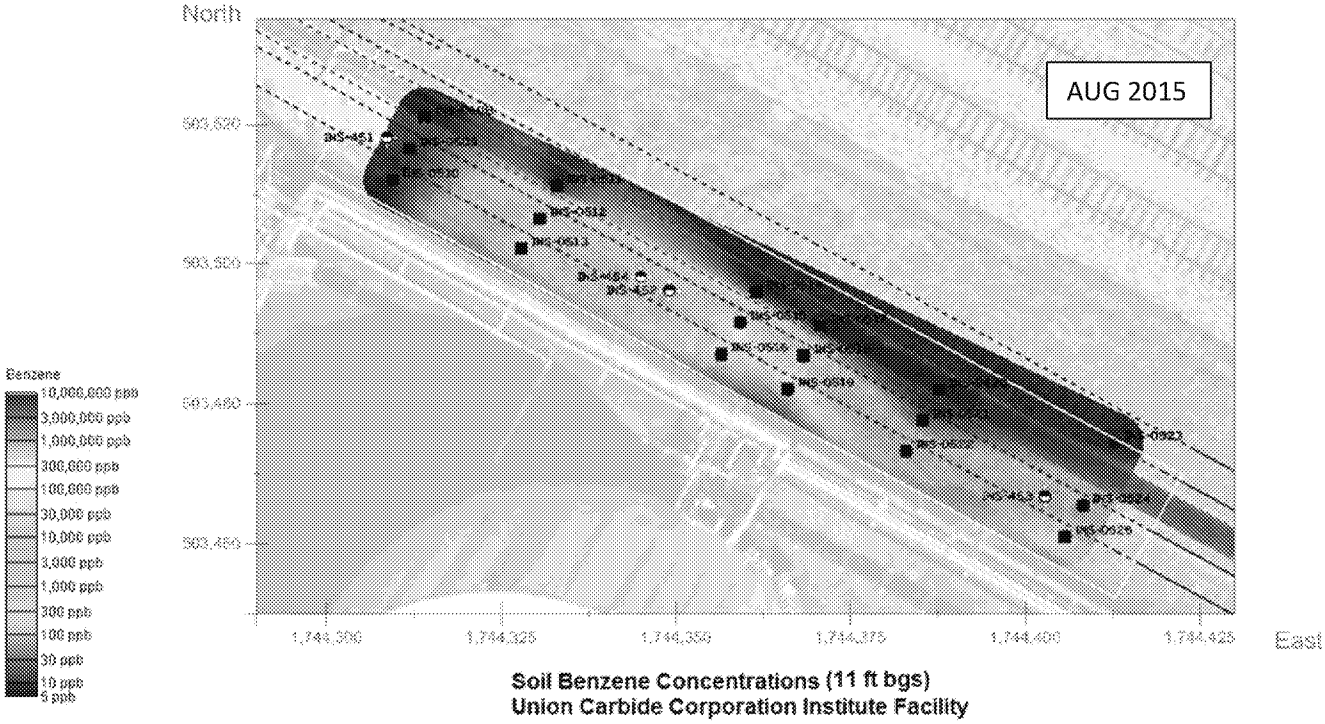
Soil Benzene Concentrations (9 ft bgs) - March 2016
Tank 1010 Site - UCC Institute Facility, West Virginia

Soil Benzene Concentrations (9 ft bgs)
Union Carbide Corporation Institute Facility

COMPARISON OF MARCH 2016 TO AUGUST 2015 MVS SLICE PLANES
BENZENE CONCENTRATIONS IN SOIL (PPB)

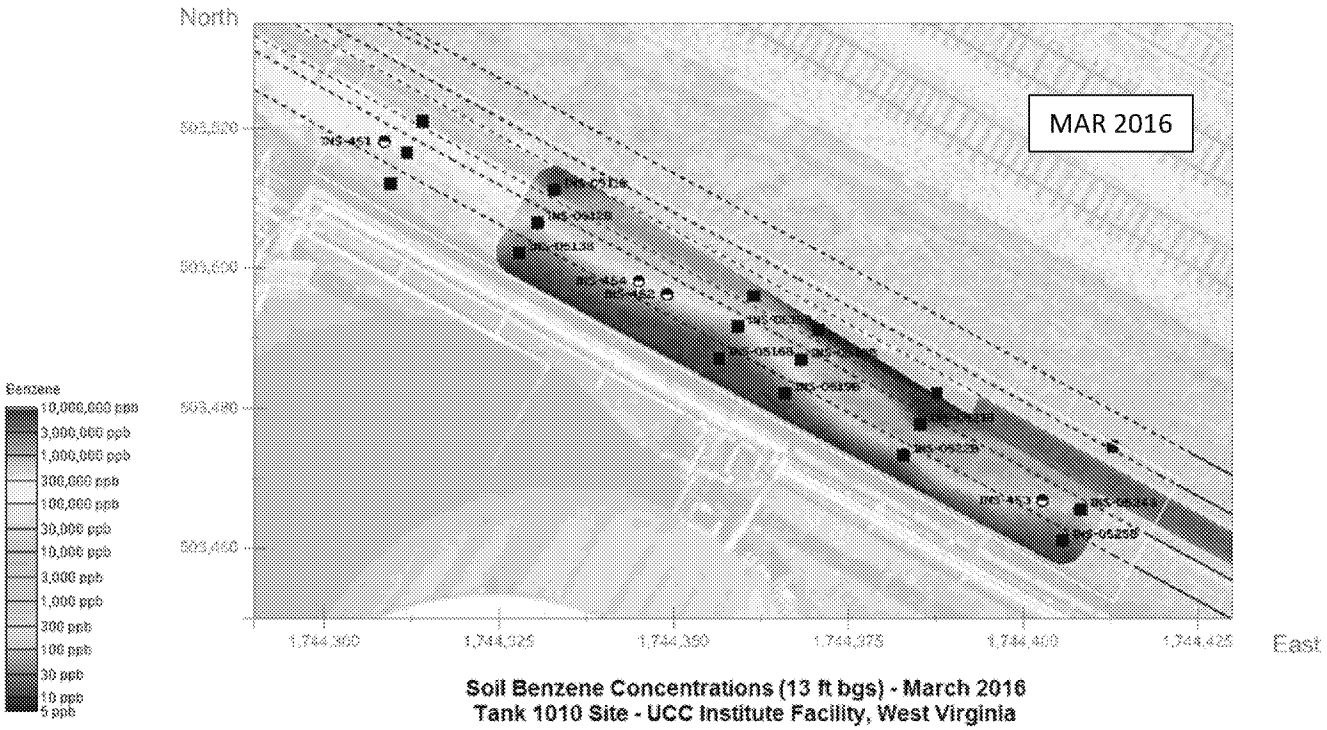


Soil Benzene Concentrations (11 ft bgs) - March 2016
Tank 1010 Site - UCC Institute Facility, West Virginia

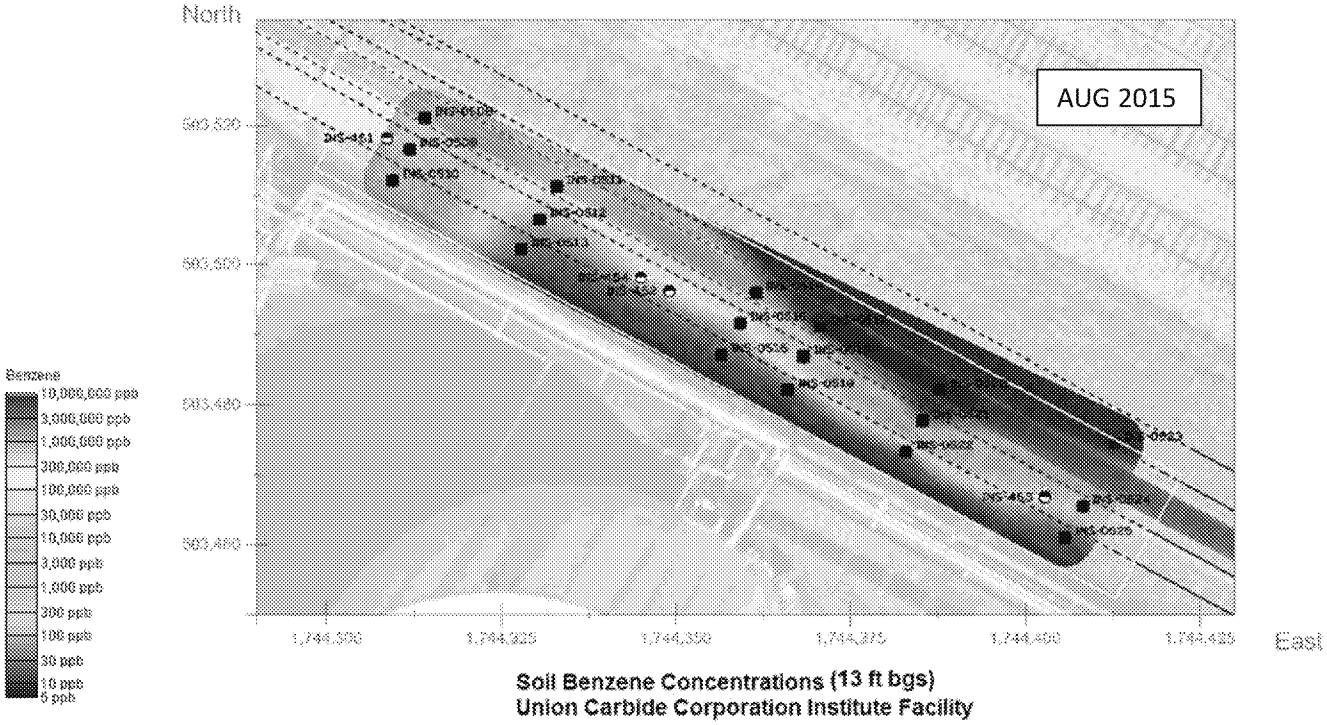


Soil Benzene Concentrations (11 ft bgs)
Union Carbide Corporation Institute Facility

COMPARISON OF MARCH 2016 TO AUGUST 2015 MVS SLICE PLANES
BENZENE CONCENTRATIONS IN SOIL (PPB)

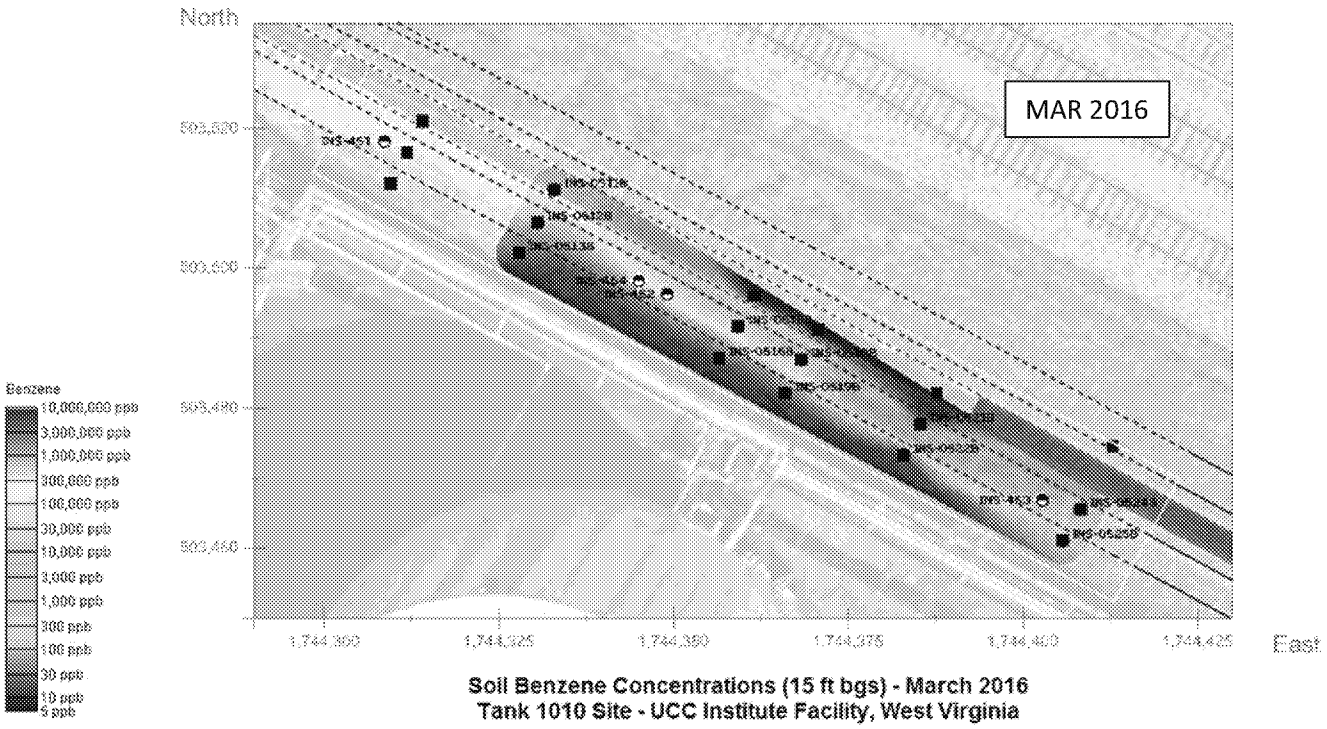


Soil Benzene Concentrations (13 ft bgs) - March 2016
Tank 1010 Site - UCC Institute Facility, West Virginia

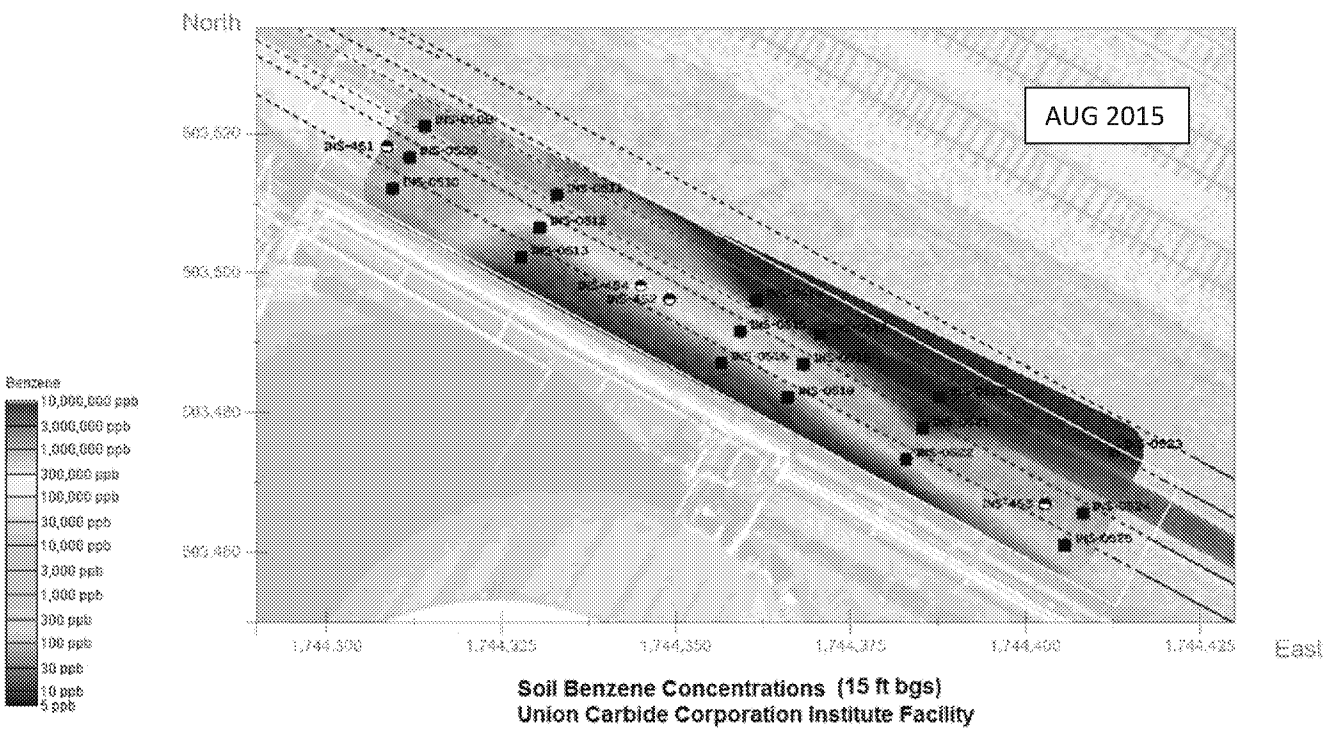


Soil Benzene Concentrations (13 ft bgs)
Union Carbide Corporation Institute Facility

COMPARISON OF MARCH 2016 TO AUGUST 2015 MVS SLICE PLANES
BENZENE CONCENTRATIONS IN SOIL (PPB)

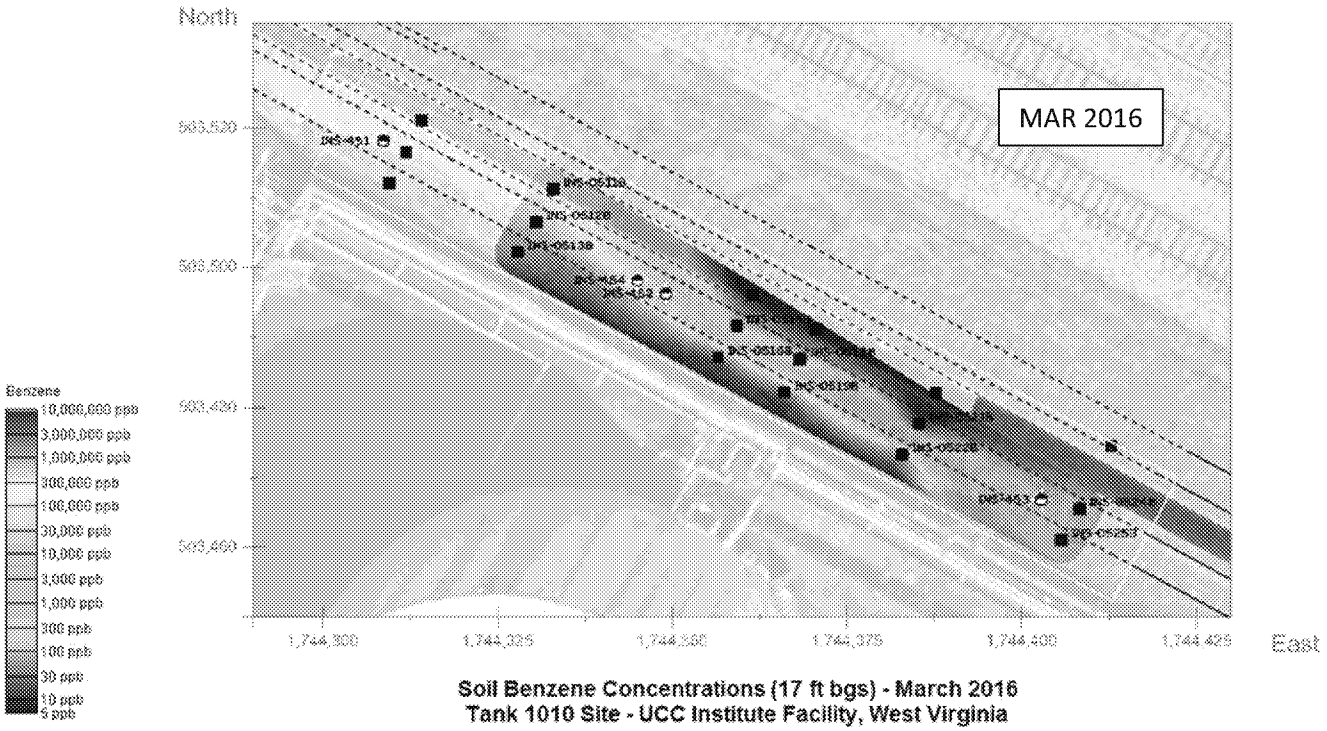


Soil Benzene Concentrations (15 ft bgs) - March 2016
Tank 1010 Site - UCC Institute Facility, West Virginia

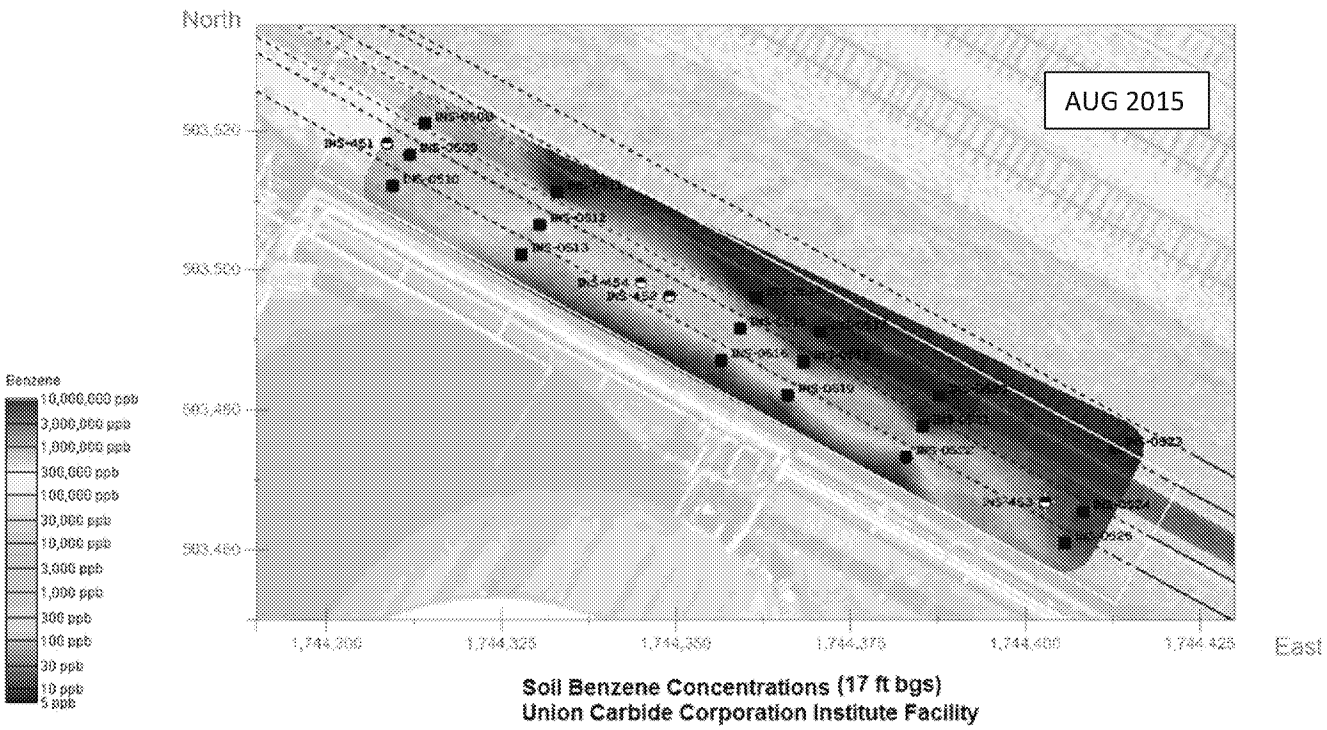


Soil Benzene Concentrations (15 ft bgs)
Union Carbide Corporation Institute Facility

COMPARISON OF MARCH 2016 TO AUGUST 2015 MVS SLICE PLANES
BENZENE CONCENTRATIONS IN SOIL (PPB)

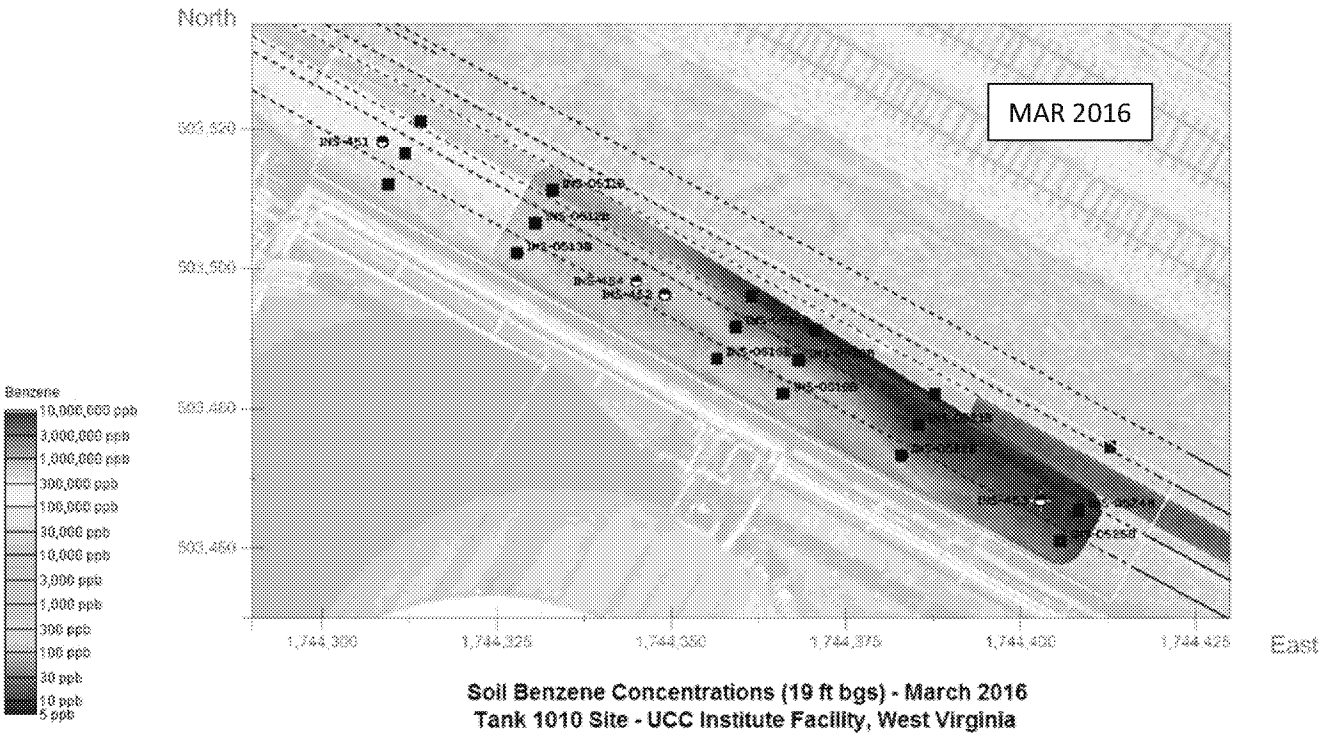


Soil Benzene Concentrations (17 ft bgs) - March 2016
Tank 1010 Site - UCC Institute Facility, West Virginia

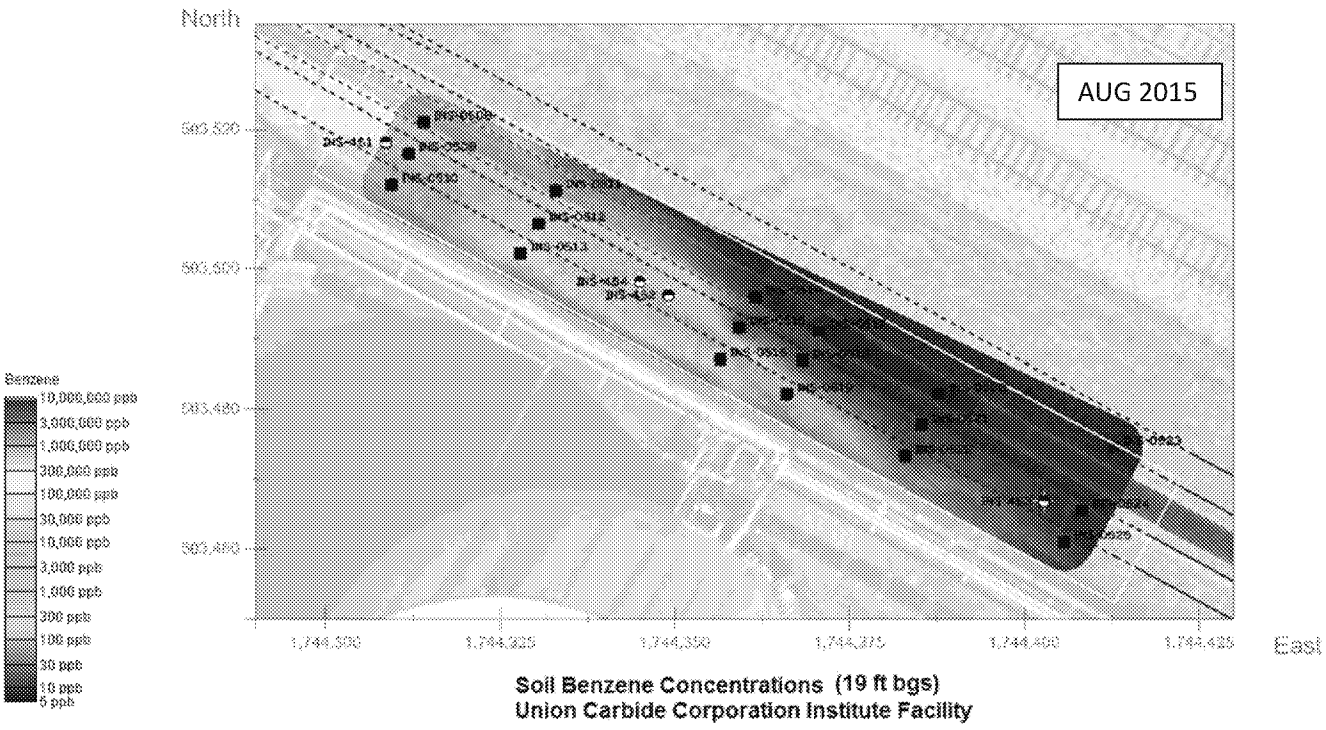


Soil Benzene Concentrations (17 ft bgs)
Union Carbide Corporation Institute Facility

COMPARISON OF MARCH 2016 TO AUGUST 2015 MVS SLICE PLANES
BENZENE CONCENTRATIONS IN SOIL (PPB)

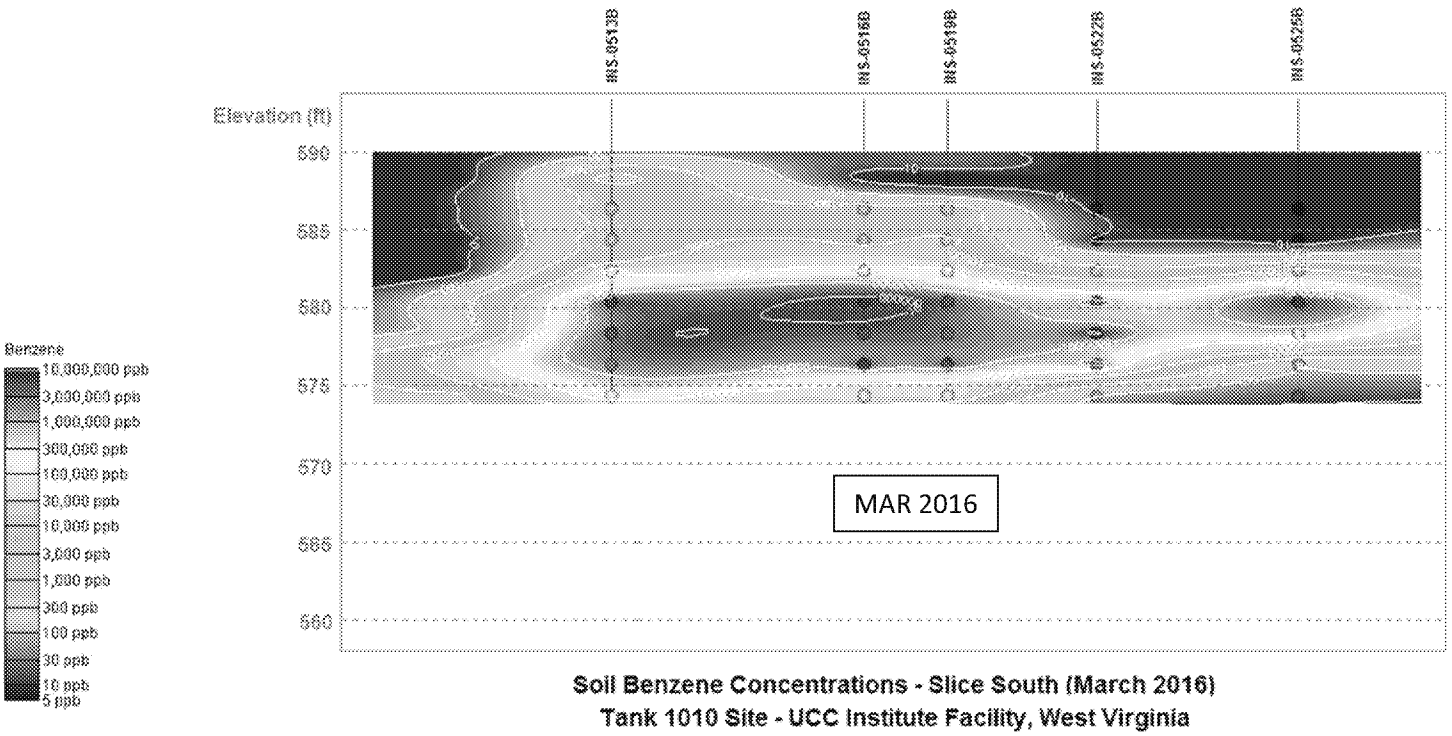


Soil Benzene Concentrations (19 ft bgs) - March 2016
Tank 1010 Site - UCC Institute Facility, West Virginia

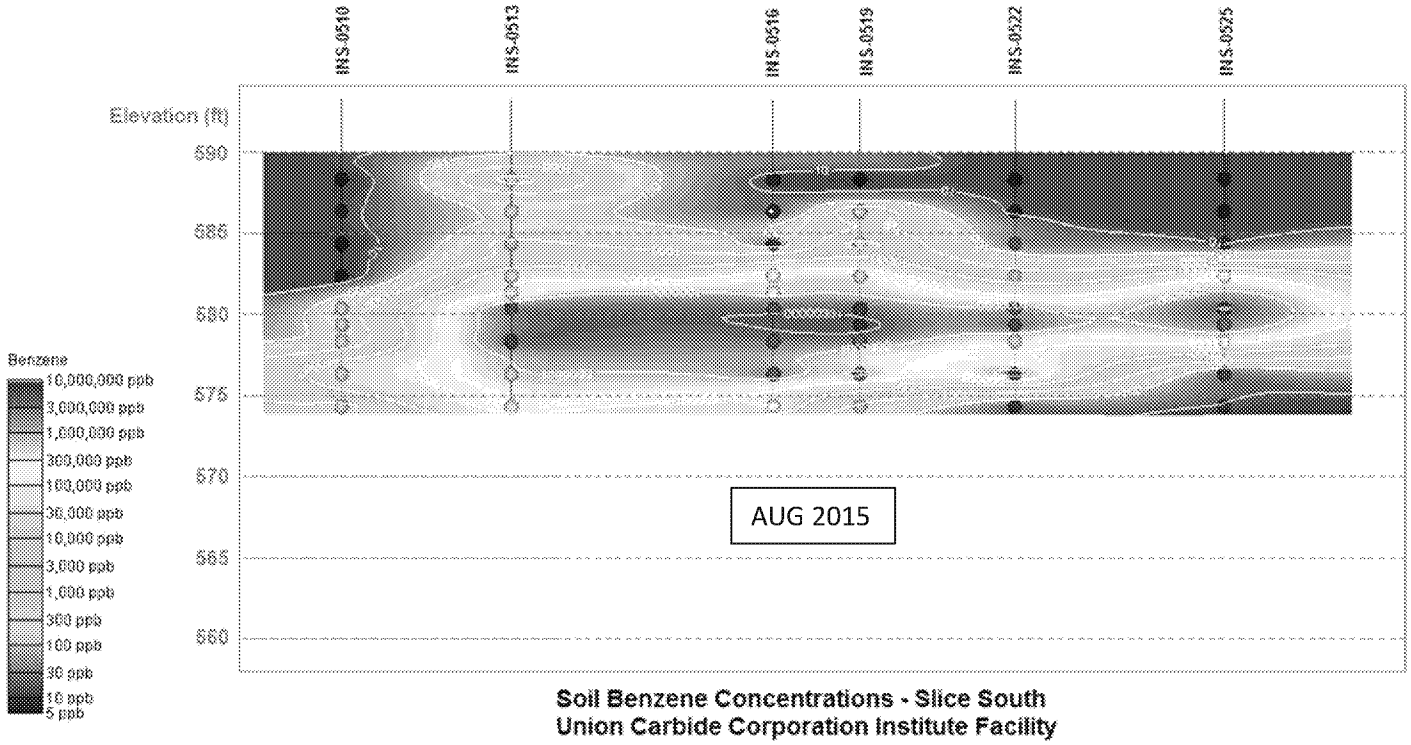


Soil Benzene Concentrations (19 ft bgs)
Union Carbide Corporation Institute Facility

COMPARISON OF MARCH 2016 TO AUGUST 2015 MVS SLICE PLANES
BENZENE CONCENTRATIONS IN SOIL (PPB)

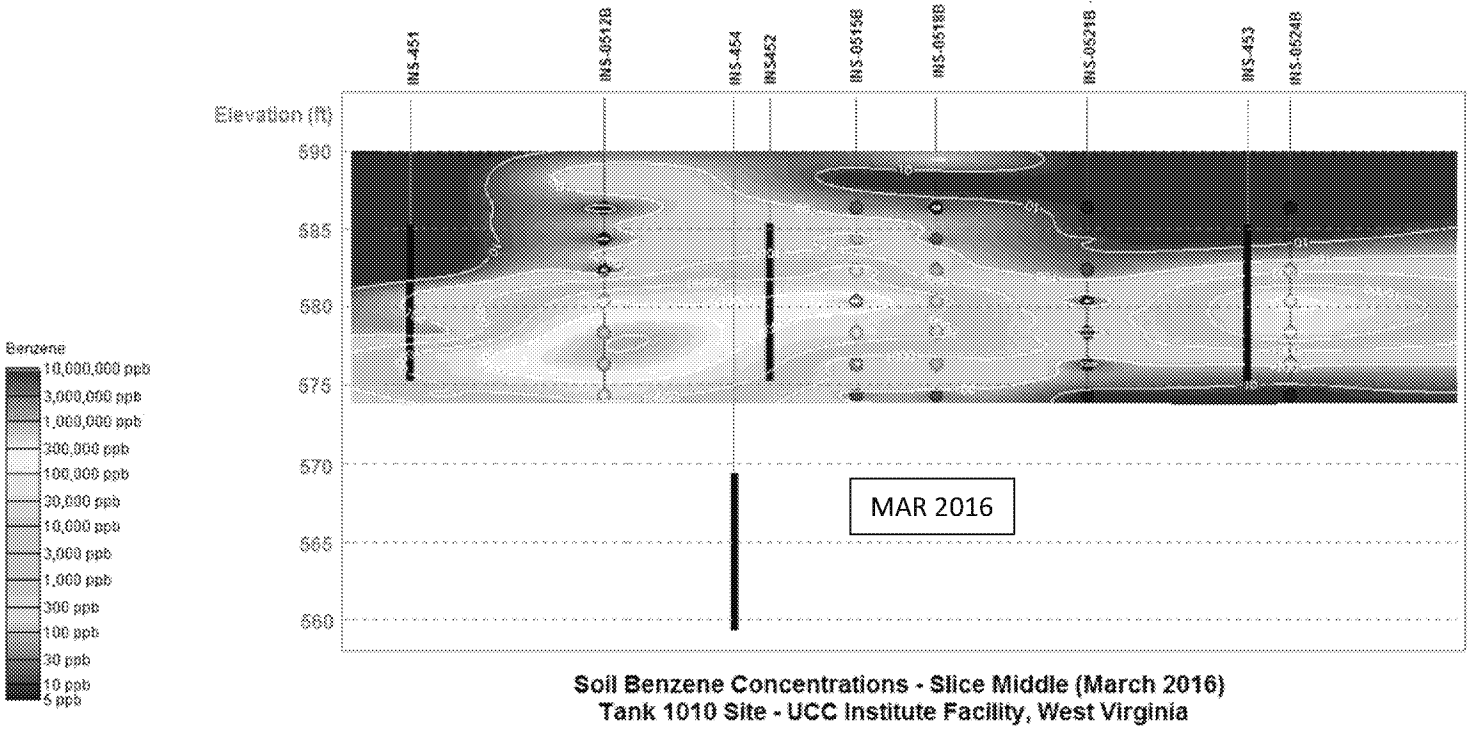


Soil Benzene Concentrations - Slice South (March 2016)
Tank 1010 Site - UCC Institute Facility, West Virginia

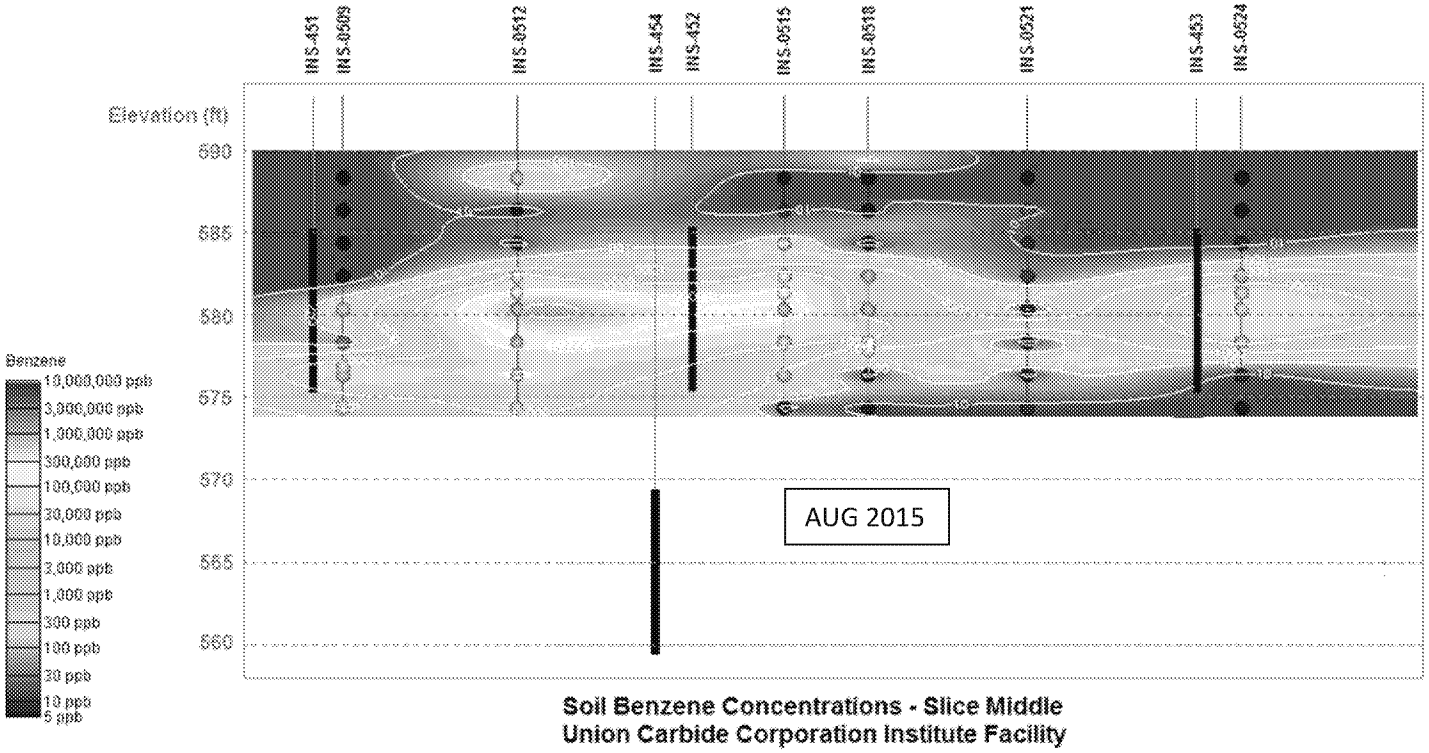


Soil Benzene Concentrations - Slice South
Union Carbide Corporation Institute Facility

COMPARISON OF MARCH 2016 TO AUGUST 2015 MVS SLICE PLANES
BENZENE CONCENTRATIONS IN SOIL (PPB)



Soil Benzene Concentrations - Slice Middle (March 2016)
Tank 1010 Site - UCC Institute Facility, West Virginia



Soil Benzene Concentrations - Slice Middle
Union Carbide Corporation Institute Facility

Attachment E
Laboratory Reports
(Presented on CD)